

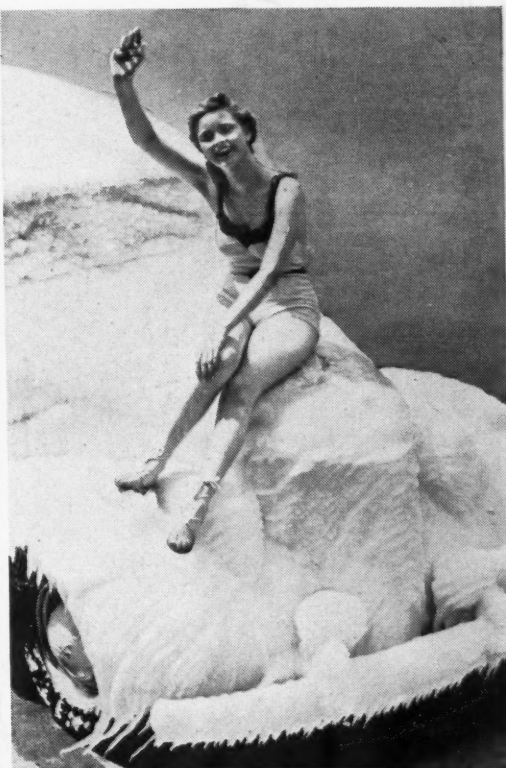


MOTOR AGE

CHILTON PUBLICATION
DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

NOVEMBER
1938

IN THIS ISSUE



Forecast—Cold Weather!

Tune up your shop for peak performance—get after the winter tune-up trade!

More New Cars

Continuing pictures and descriptions of the 1939 models. Stories on thirteen of the new cars in this issue.

Servicing Auto-Lite Distributors

Another picture service story. Easy to follow, step by step instructions on servicing these units.

Up-to-date Engine Tuning

Outlining an orderly procedure for remedying many of the commonly encountered difficulties in tune-up work.



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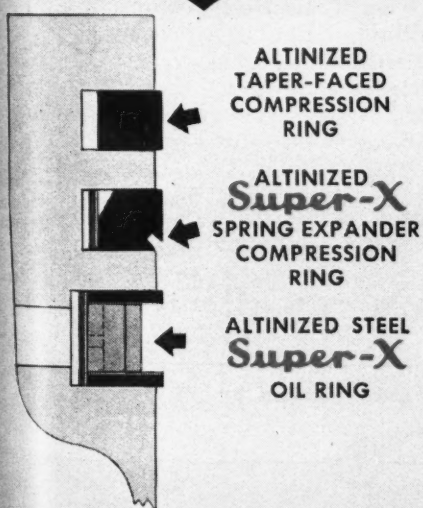
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In This Issue

Cover photo, courtesy Studebaker Corp.

Servicing Auto-Lite Distributors. By Bob Turner	12
1939 Car Descriptions:	
American Bantam	14
Cadillac-LaSalle	15
Chevrolet. by Joseph Geschelin	16
Chrysler	17
De Soto	18
Dodge	19
Ford, Mercury	20
Graham	21
Hudson. By Joseph Geschelin	22
Lincoln-Zephyr	23
Nash	24
Oldsmobile	25
Overland	26
Line Up Profits with Wheels	27
Up-to-date Engine Tuning. By W. R. Bamford	29
Factory Service Hints	30
The Readers' Clearing House	31
Parts Prices, Hudson 112, Series 89, 1938	32
Motor Car Price, Weight and Body Table	34
News and New Products	37
Mechanical Specifications	58
Tune-up Specifications	59
Advertisers' Index	75

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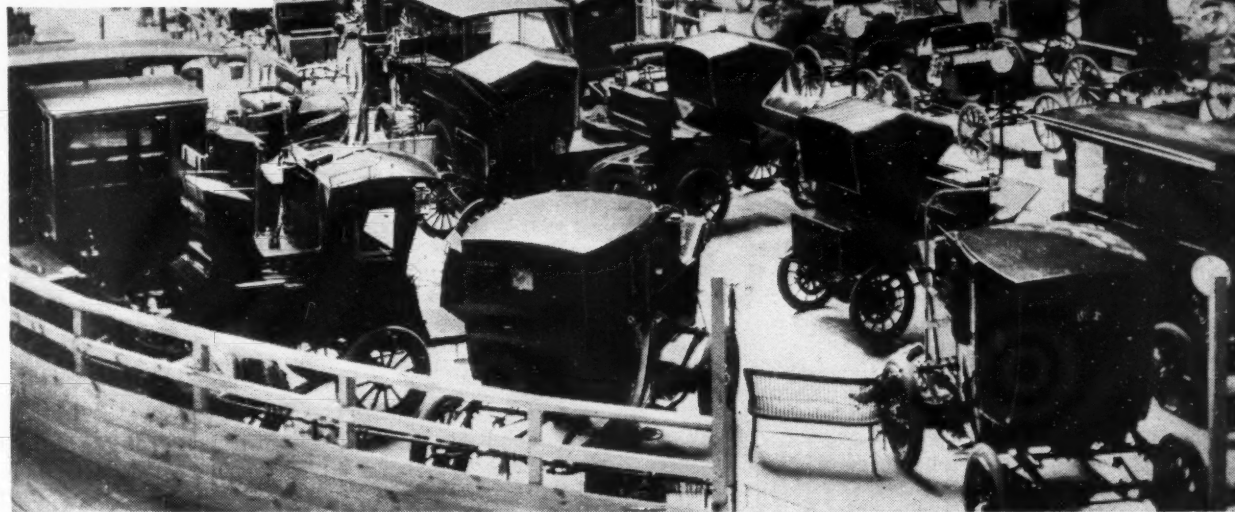
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MOTOR AGE

NOVEMBER 1938



SHOP TALK

New Cars

Examine the cars at this year's auto show and you'll see that manufacturers are pretty much in agreement as to how an auto should look. That wasn't the case in 1900 when the first automobile show, pictured here, was held at the old Madison Square Garden. Some cars looked like bicycles, some like carriages, while others resembled the locomotives of that era. Socony Vacuum sent me the photo and saved me a lot of trouble locating one for this page.

Grief

I don't know, but I hope I have finished with my share of grief. About a month ago, I put in a set of new king pins. Had just about finished that job, when I couldn't shift into second, so I had to rip the transmission apart to install a set of those detent springs. While I had it apart, I put in a new clutch. Maybe I don't live right or something, but I just about had the job out on the road when I broke three chassis springs.

Then the carburetor started to flood. I think I have had my share of grief and a couple of other guys' as well.

Tractors

Howard Everett, who was managing editor of the old *Automobile Trade Journal* when I was the technical editor, says there is a rapidly growing market for tractor service. Howard, who is now editor of *Implement and Tractor*, points out that in 1936 farmers bought 185,000 tractors and in 1937—241,000. That's a lot of tractors, and shops in rural sections should be doing a lot of tractor repairs.

Diesels

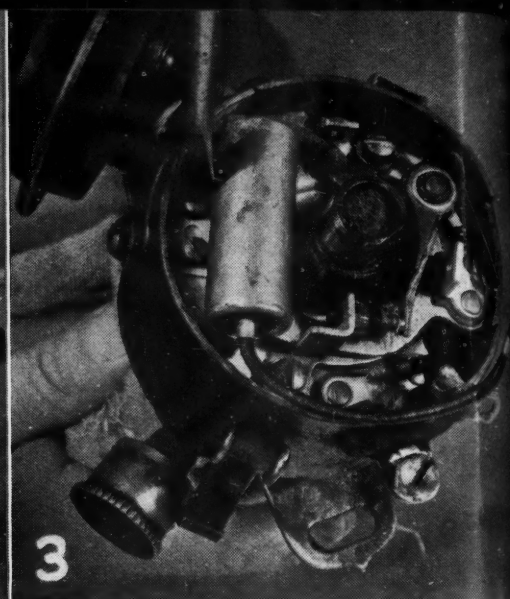
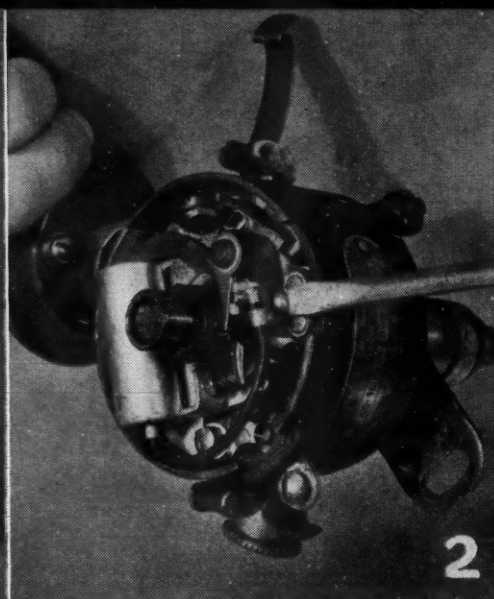
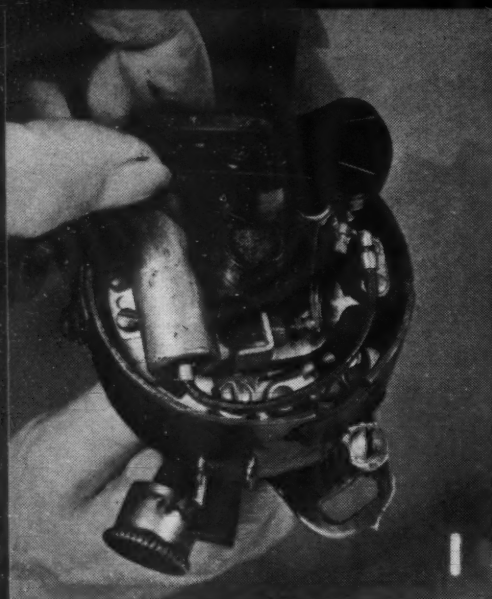
Speaking of precision, which we weren't, I went out to Joe Parkins' the other day to get some dope on Diesel fuel injectors. Boy, what a clockmaker's job that is! When you check a part, you screw one of those watchmaker's gads into your eye so that the slightest scratch looks like the

Grand Canyon. You need a whole room full of special equipment to test and overhaul one of those babies. The injectors will run for years if you feed them nothing but clean oil. But if any dirt gets in, look out for trouble.

Appointment

"Years ago you failed to give me the right remedy for a V-16 Cadillac," complains Gene Ray of Los Angeles, "and you also offered to appoint me as West Coast manager of the Clearing House with a salary of three cents per year." Now, believes Gene, after years of consideration, he is worthy of the job and if it is still vacant accepts. Well, well and another well. The job is still open, Gene, but if my memory serves me correctly, and I think it does, the salary was to be three slightly used cotter pins. But I'm not one to haggle, if you say three cents why three cents it is, and consider yourself appointed.

Bill Toboak



- 1—After distributor body is removed from car, lift out rotor.
- 2—Remove screw holding connection from movable contact arm to condenser.
- 3—Remove screw holding condenser in place and lift out condenser.
- 4—Lift out movable contact arm.
- 5—Remove two screws holding vacuum advance unit to distributor housing and lift out advance assembly.
- 6—Remove the two screws that hold breaker plate in place.

- 7—Remove breaker plate assembly.

- 8—To Remove shaft and automatic advance assembly, remove pin from offset coupling on lower end of shaft. The assembly can then be removed from top of housing. The governor weight springs in this distributor consist of one heavy and one light spring. Be sure these springs are replaced in their proper positions.

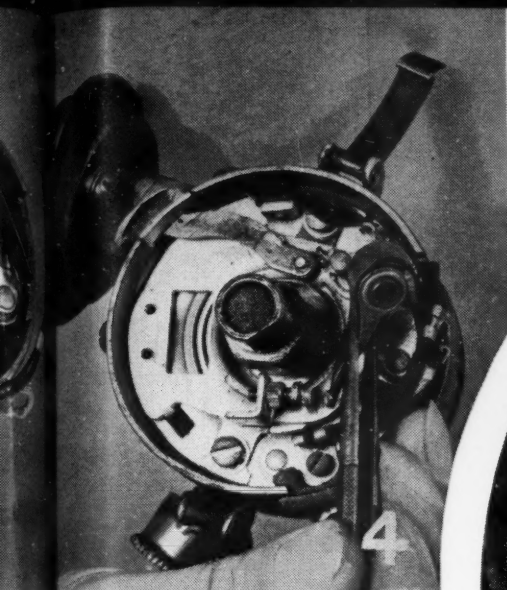
- 9—Breaker points may be set on bench after distributor is reassembled. Breaker point gap should be set to .020 inch.

Servicing Auto-Lite

GENERAL

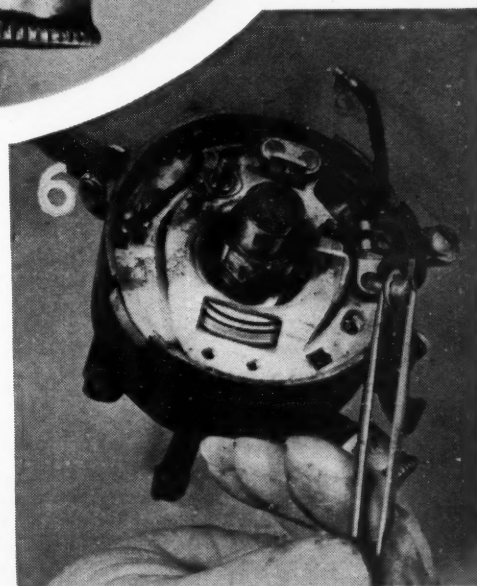
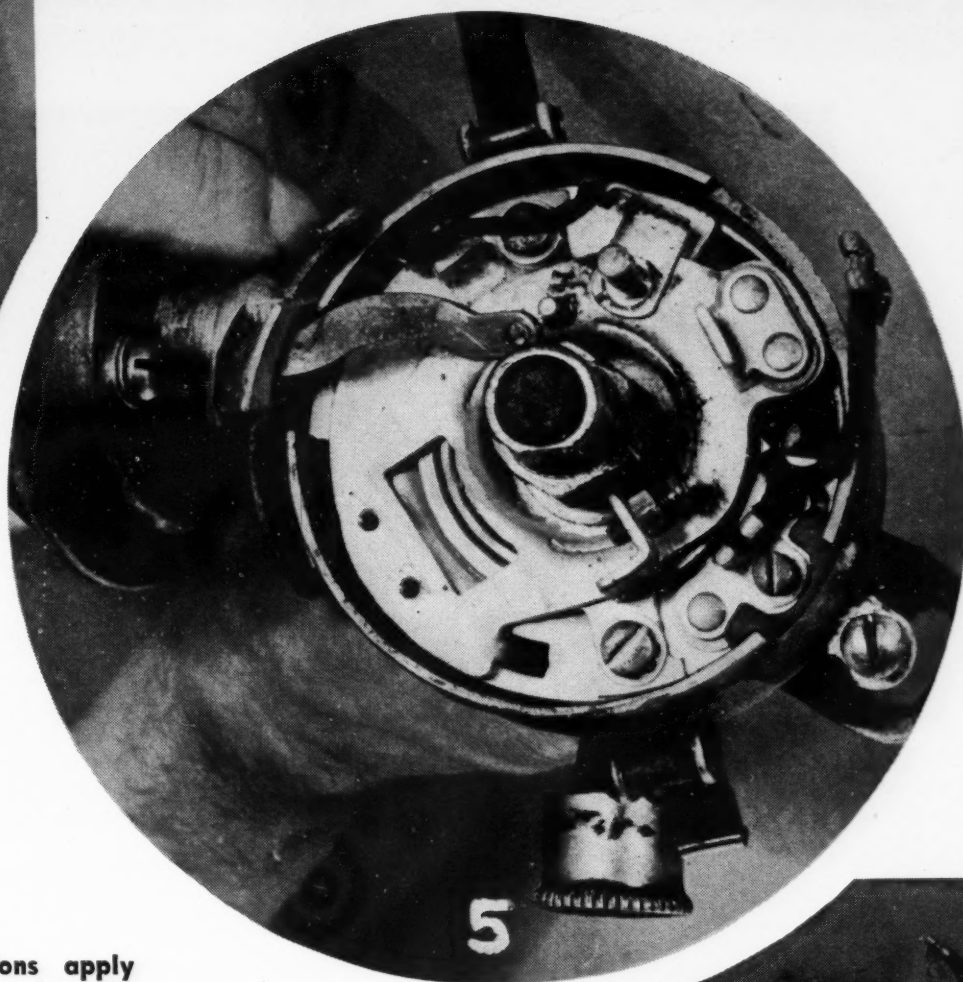
Clean all parts thoroughly with gasoline and air or acetone and air. Make sure breaker plate bearing works freely with no binding throughout its entire range. Check vacuum advance assembly

to determine if diaphragm and springs operate. This may be done by connecting the unit to another engine or drawing on vacuum line connection with mouth.

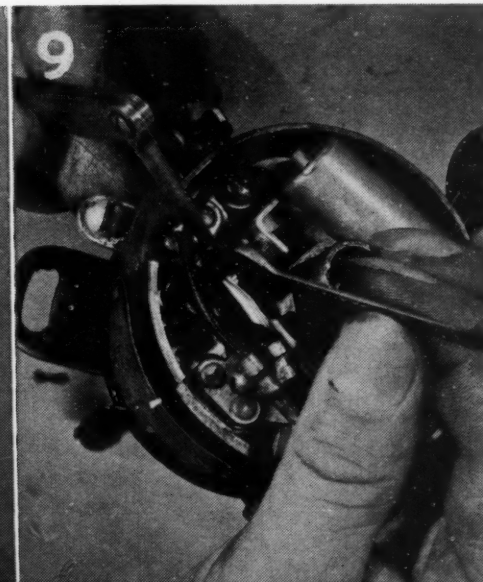
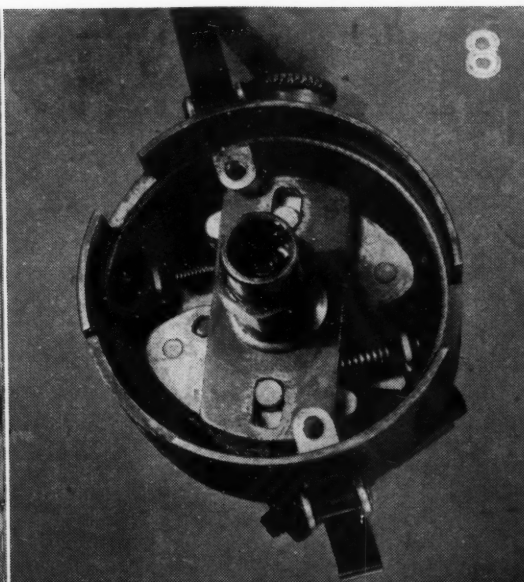
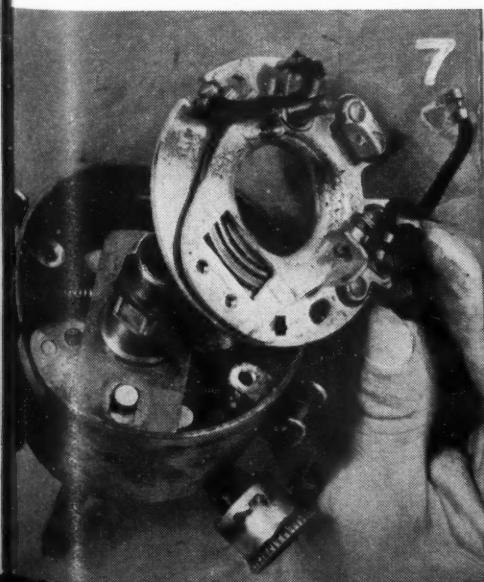


By
BOB TURNER

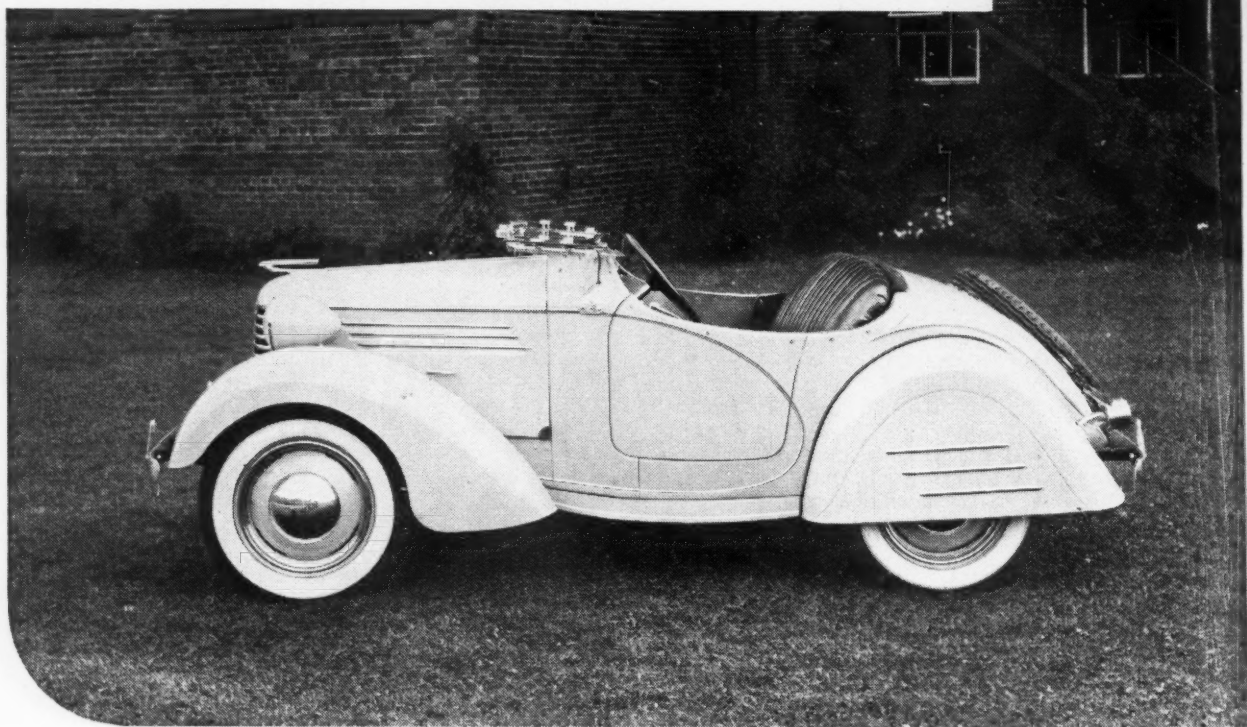
While these instructions apply particularly to the unit used on the 1937 Plymouth, they are also applicable to other Auto-Lite units of the single breaker type.



Distributors



American Bantam



American Bantam "60" De Luxe roadster

BANTAM bids for a larger share of the 1939 motoring market with lower prices and six new models added to the five passenger and commercial cars which were introduced at the 1938 Automobile Shows. While economy and low price are still featured, the cars are styled for greater appeal to the pleasure car buyer. Distributor and dealer discounts have been increased.

Paced by the Standard Coupe which delivers completely equipped at the factory for \$399 with Federal Taxes paid, Bantam passenger cars range in price up to \$565 for the 4-passenger Station Wagon. New models include the Standard Coupe, the Station Wagon, a new low-priced Roadster, a Deluxe Roadster, a 4-passenger Speedster and a Deluxe 4-passenger Speedster.

Deluxe open cars are equipped with white sidewall tires, tooled genuine leather upholstery, matched dual horns, dual tail and stoplights, trim-matched horn buttons and gear shift knobs, and chrome grille, wheel rings, wiper, scuffplates, license brackets and

Chassis and engine improved for greater economy, roadability and smooth operation

hand-tooled stainless steel instrument panel.

The new Bantam motor has been improved to give even greater economy and flexibility of operation. Included in the long list of changes are improved carburetion, ignition, valves, motor mounting, manifolding, cylinder head design, cooling and lubrication.

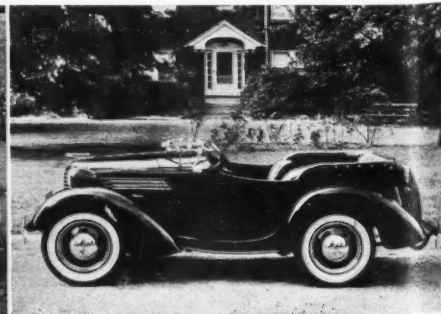
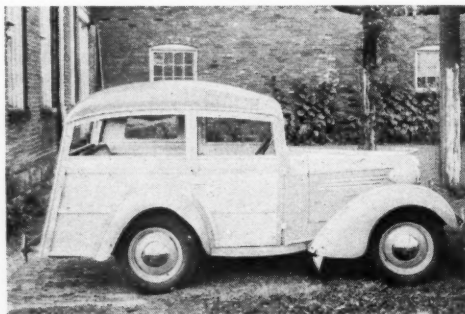
Those improvements combined with a new smooth-acting clutch and improved transmission are designed to make gear shifting effortless and to add to the ease of operation.

The new chassis incorporates road-balanced steering with shorter turning radius, which makes Bantam parking possible in a total space of less than the length of the average car.

The emergency brake has been re-located for accessibility and to give more leg room.

Now duo-rate springing lowers over-all height of the car three inches, which is designed to better riding and roadability without loss of headroom. Bumper guards, radiator ornament and chrome hubcaps are standard.

(Left) Bantam "60" Station Wagon.
(Right) Bantam "60" four-passenger Speedster.



Cadillac & LaSalle



1939 Cadillac Fleetwood

La Salle wheelbase shortened four inches but overall length is more than '38 models

FIVE series, featuring thirty-six body styles, comprise the Cadillac-LaSalle line for 1939. With the exception of the Sixteen, all models are new in appearance, particularly as to the hood treatment, three-section die-cast radiator grilles, and the smartly faired, long-bodied headlamps mounted on the hood side.

The LaSalle differs from the other models in front-end styling, featuring a vertical grille of slender proportions, and two fender-mounted side grilles. The Cadillac eights resemble

each other in styling, with characteristic gracefully - formed radiator grilles and fender-mounted side grilles.

Sunshine roofs, an optional feature, will be available on the Series 50, 60S and 61 five-passenger sedans, and on the Series 50 five-passenger touring coupe. The LaSalle this year has a wheelbase of 120 instead of 124 in., but its overall length is 1 in. more than last year. The "competitive" Series 65 has been dropped, while Series 61 has a new frame and also

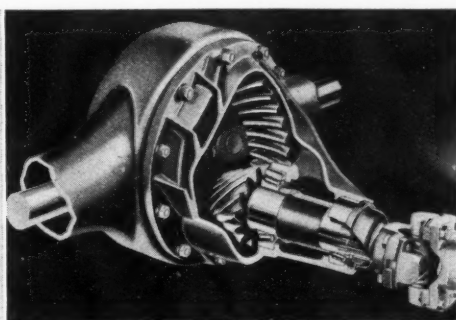
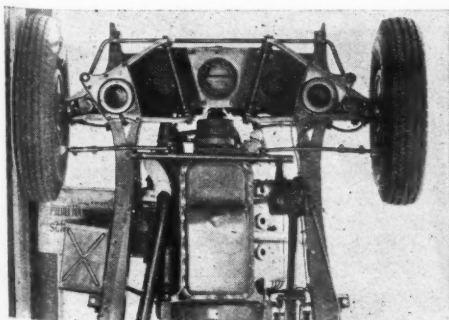
a new wheelbase length of 126 inches.

In the LaSalle and Series 61, riding comfort has been increased by the introduction of the "high-plane Hotchkiss drive" and new variable-rate rear-spring suspension incorporating a tension shackle.

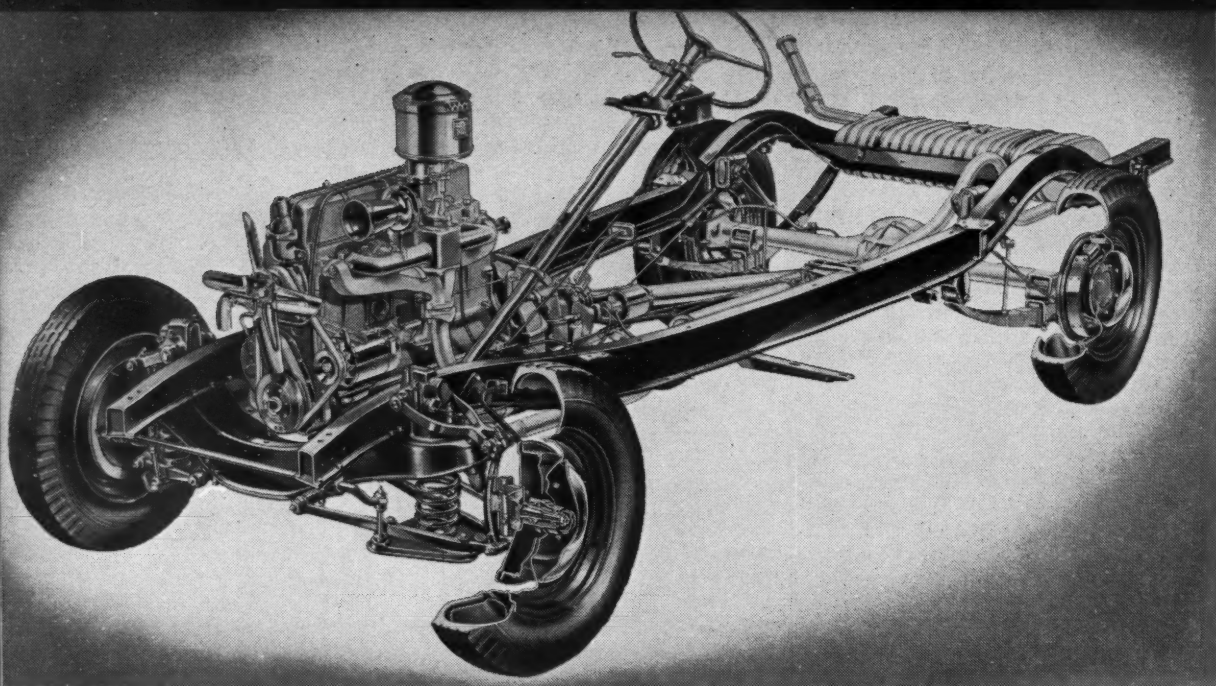
While dimensions of all series remain unchanged engine supports on the 50, 60S and 61 are now non-adjustable. To improve the camshaft balance, the fuel-pump eccentric has been relocated and a balance weight added to the sprocket. On all V-8s Perfect-Circle rings with Ferrox treatment are now used, and the top land on the piston has been made wider to better protect the upper ring against heat. The top compression ring is narrower (3/32 in.), and deeper to increase the unit pressure.

A crankcase ventilating outlet is now located in the slip stream below the rear part of the engine. The new oil pan is shorter and deeper, which permits running safely on a smaller oil reserve. All models except the Series 90 now have a tube-and-fin-type

(Continued on page 63)



(Left) Steering linkage on 1939 La Salle and 61. (Right) La Salle 61 rear axle cut-away.



By
**JOSEPH
GESCHELIN**

Chevrolet

FRESH eye appeal, new Fisher bodies with restyled interiors, new sheet metal and appointments characterize the outward appearance of the 1939 Chevrolet line comprising the Master deluxe models and the companion model Master 85. The Master 85 offers a line of economy models corresponding in all essentials to the Master deluxe series save for the use of conventional front end springing. On the deluxe model the Dubonnet suspension has been superseded by a new wish-bone type of knee action.

At a casual glance, there is no outward difference between the two new Chevrolet series. The only variations are that a stainless steel running board moulding is not used on the Master 85, and the license lamp body on the trunk sedans and the business coupe is decorated only with a chrome-plated Chevrolet emblem. The model name on the hood louvers reads "Master 85." While bumper guards are not furnished, they are available at slight extra cost, except for the rear of the Station Wagon.

Features found in both series include undercowl handbrake lever, steering column gearshift (optional at slight extra cost), and redesigned instrument panel with controls re-grouped for safety and convenience.

Mechanically, the Master deluxe models offer some striking features. There is a new flat ride due to the introduction of open coil spring front

knee action suspension, combined with softer rear springs, harmonizing front and rear spring action, double-acting hydraulic shock absorbers front and rear, and an effective stabilizer in front. The new wish-bone type knee action supersedes the Dubonnet suspension used by Chevrolet since 1934.

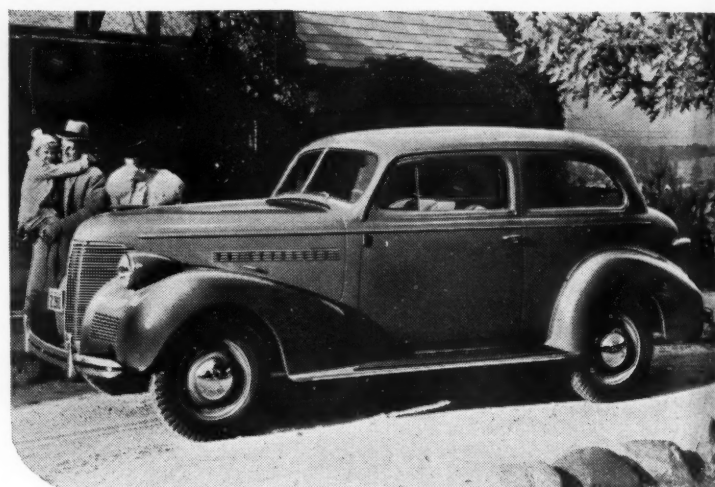
Simplified steering linkage on the Master deluxe, combined with an overall ratio increased from 18.2 to 21.6 produces easier steering and smoother and more positive action.

Interesting feature on both chassis

is remote control gear shifting offered as an option, embodying a vacuum power mechanism providing truly finger tip shifting.

Chief improvement in the simplified Chevrolet clutch, introduced last year, is provision for ventilation and cooling. For this purpose, angular vanes are cast on the rear face of the pressure plate to circulate air outward from the center of the clutch. The addition of the vanes, coupled with changes in the contour of the plate, increase cooling area and cooling

(Continued on page 46)



(Top of page) New Chevrolet Master De Luxe chassis, cut away to reveal suspension, steering and brake details. (Directly above) The Chevrolet Master De Luxe Town Sedan.

**Under-cowl brake lever standard,
remote shift lever optional for '39**



(Top of page) Chrysler Royal four-door sedan with 119 in. wheelbase. (Directly above) The rear of the Royal has been smoothed out and the tail lights have been relocated.

Chrysler

Chrysler features improved transmission and increased horsepower

INCREASED horsepower, a new transmission, a column-mounted shift lever, thoroughly modern appearance, greater roominess, and many minor refinements feature the Chrysler lines for 1939. Chrysler again offers three lines—the Royal, the Imperial, and the Custom Imperial, with a total of 13 body styles.

The Royal, of 119-in., and the Imperial, of 125-in. wheelbase, come in four body styles, namely, four-door sedan, two-door sedan or brougham, coupe and victoria coupe, the latter seating four persons. The

Custom Imperial has a wheelbase of 144 in. and is built in five-passenger sedan, seven-passenger sedan and sedan-limousine body styles.

By increasing the compression ratio from 6.2 to 6.5 and making improvements in the manifold and in the carburetor, the horsepower of the Royal has been raised to 100. The bore and stroke remain the same, 3% by 4½ in., the piston displacement being 241.5 cu. in. A new eight-cylinder engine of 130 hp. is used in all cars built on the Imperial and Custom Imperial chassis. It has a bore

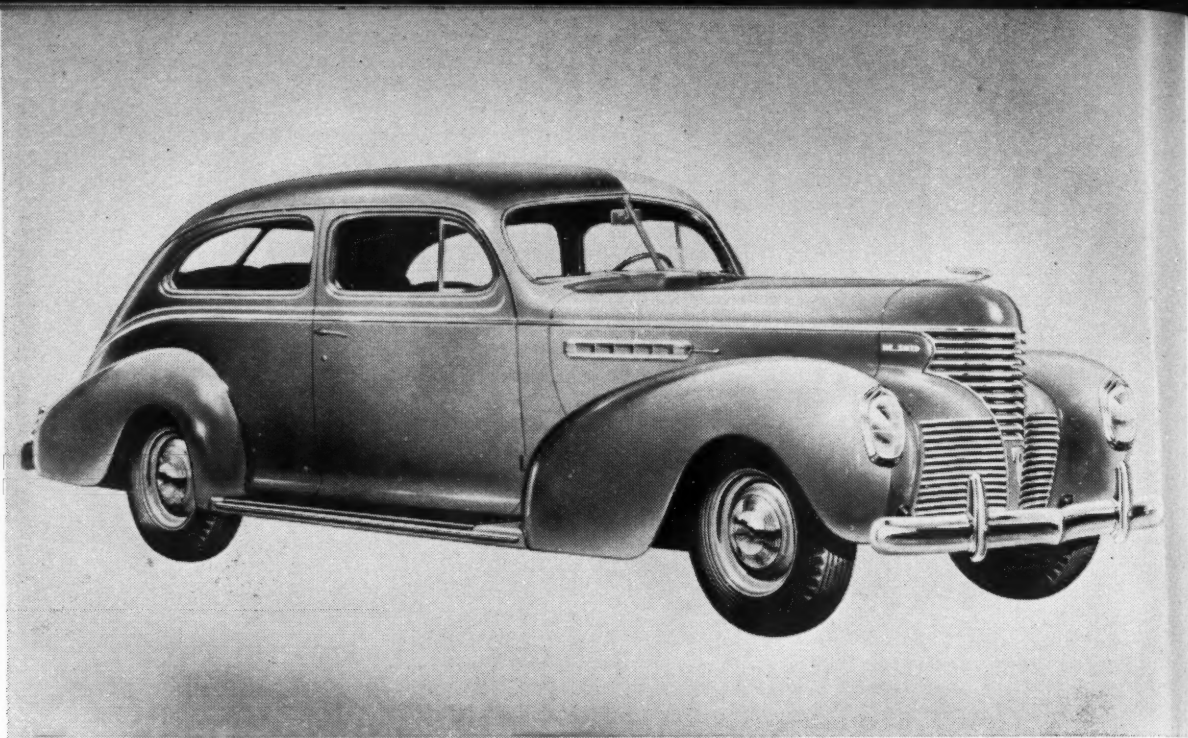
of 3¼, and a stroke of 4⅞ in., making the displacement 323.5 cu. in. This engine has the same cylinder dimensions as those which were used in the 1938 Custom Imperials, but the compression ratio has been increased to 6.8 and the valve design improved. The new engine has a full-length water jacket, a water distributing tube, and a new five-blade fan.

An improved transmission, known as the "Cruise and Climb," is one of the more important 1939 Chrysler features. It is similar in principle to the overdrive previously used in Chrysler cars, but it cuts in at between 23 and 28 m.p.h., instead of at over 40. A solenoid control makes it possible to cut out the overdrive by pushing the accelerator to the floor. When the pedal is released the overdrive cuts in again. This "Cruise and Climb" transmission is standard equipment on the Custom Imperial and extra on the Royal and Imperial.

Speedometers on Chrysler 1939 models include a safety feature. They are illuminated whenever the instrument lights are on. Up to 30 m.p.h.—the legal speed limit in many cities—the light shows green. From 30 to 50 m.p.h. it is amber, and at 50 m.p.h. it changes to a brilliant red.

Shift levers on all Chrysler models are now column-mounted. The various shifts are made exactly as before, but in a vertical instead of in a horizontal plane. To remove the remain-

(Continued on page 57)



Two-door touring sedan

DeSoto

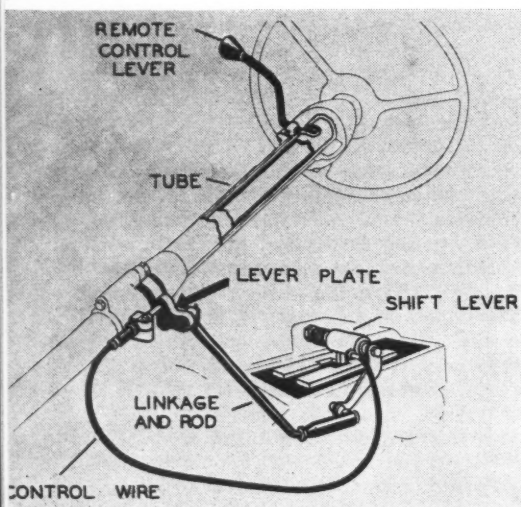


Diagram of De Soto remote control gear-shift mechanism

Remote shift standard, overdrive optional for De Soto's offering of two lines for 1939 model year

DE SOTO will offer two lines of cars for 1939, the Custom line and the De Luxe line, both on the same six-cylinder chassis, which comes with a 119-in. wheelbase for the majority of body types and a 136-in. wheelbase for seven-passenger models.

In sedans the luggage locker has 23 cu. ft. usable space, 27 per cent more than last year, while in the business coupe the usable space amounts to 48 cu. ft.

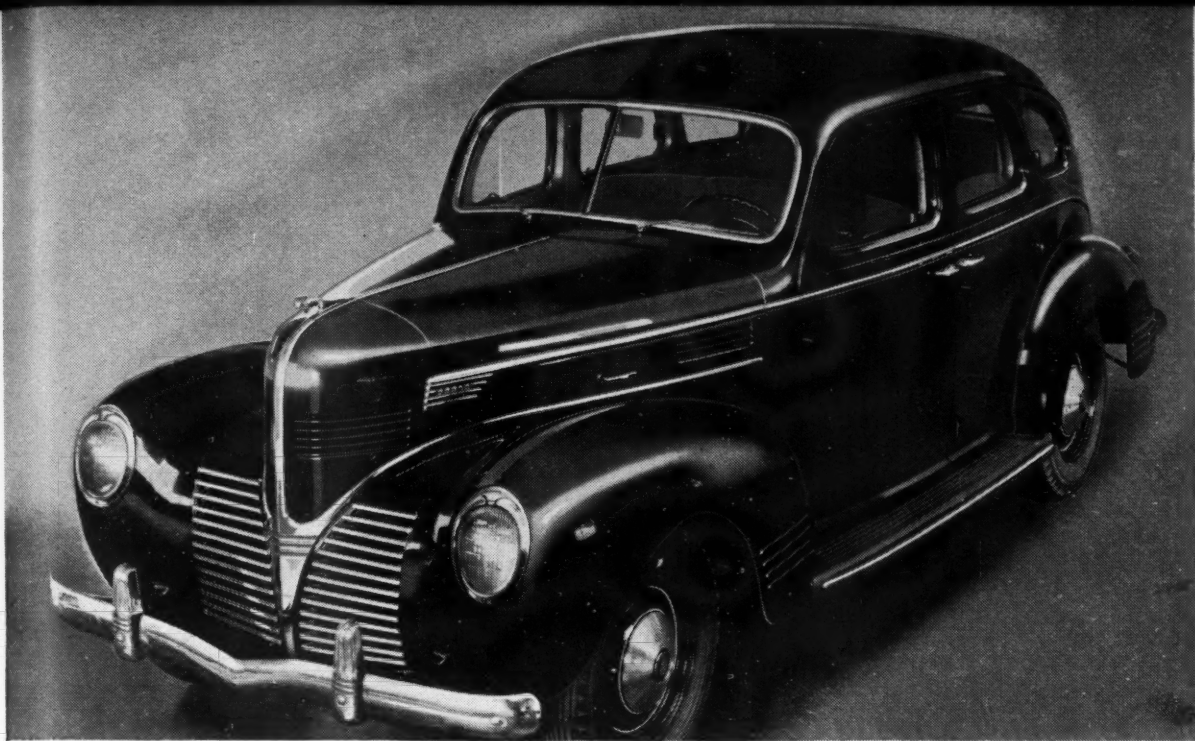
Among De Soto features for 1939

are the following: Column-mounted shift lever (standard equipment on all models), independent front-wheel springing, an overdrive (optional at extra cost) which, in combination with the three-speed-and-reverse transmission, gives five forward speeds; a new safety-signal speedometer showing green, amber or red light, according to the speed of travel; rotary door locks which obviate the need for door slamming; Durasheen finish, which is claimed to retain its luster better; a rain trap in the cowl ventilator that permits driving in rain with the ventilator open and facilitates the installation of a fresh-air attachment available on heaters; electric windshield wipers with 10-in. blades; a softer clutch requiring one-third less pedal pressure.

The six-cylinder engine has a bore of 3 $\frac{3}{8}$ in. and a stroke of 4 $\frac{1}{4}$ in. (228.1 cu. in. displacement), and is rated 93 hp. at 3600 r.p.m., with cast-iron head and 6.5 compression ratio. Aluminum cylinder heads are available at extra cost; they give a compression ratio of 7 and raise the output to 100 hp. at 3600 r.p.m. All engine working parts are provided

with the new Chrysler super-finish. Chassis springs of Amola steel have tapered leaves. A new design of air-wheel tire is fitted. The pistol-grip parking-brake lever is mounted on the dash to the left of the driver, leaving the driver's compartment entirely unobstructed. Provision for mounting a push-button tuning radio speaker behind the center panel is made in the new instrument panel. Built-in chevron-styled tail lamps are standard on all models. The steering wheel, which is of 18-in. diameter, carries a recessed horn ring. The driver's seat is adjustable and automatically rises as it moves forward. Final drive is by hypoid gears, which makes possible a flat, low floor in the rear compartment.

The motion of the shift lever is transmitted by a tube located inside the steering column. As soon as the shift lever has been moved to the "first-speed" position, it is pushed down by a spring, so that when the driver wants to shift into second, all he has to do is to perform a sweeping motion forward. By rubber-mounting the steering column on the frame the tendency to driver fatigue is reduced.



Four-door Luxury Liner

Longer wheelbase and Amola-steel coil springs featured in Dodge Luxury Liner for 1939

THE new Dodge, termed the Luxury Liner, is a car of longer wheelbase and wider body, with greater visibility, and finished in a new enamel in a wide variety of optional colors. It has a new frame with 6-in. side rails and a specially rigid front end to accommodate the Amola-steel coil springs of the independent front suspension with which this year's car is equipped. With the increase in wheelbase the rear seats have moved ahead of the rear axle, which tends toward a softer, smoother ride.

In connection with the independent front suspension, a cross-steering linkage has been developed, comprising a Y-shaped steering arm moving in a horizontal plane. A worm-and-roller steering gear is employed, and the steering ratio has been increased from 14.6 to 18.2, which, together with other changes is said to have reduced the steering effort required by 28 per cent.

Rear springs are of the leaf type and also of Amola steel. These springs are built up of thin leaves and are said to be squeakless.

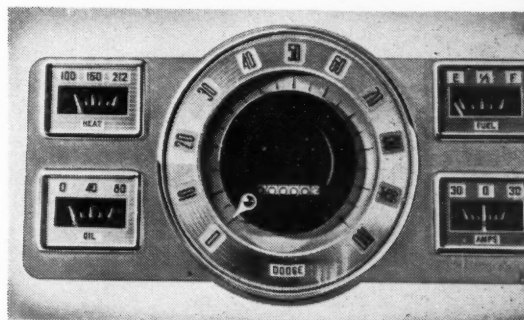
Upper hinges of the front doors are completely concealed, which adds

to the smoothness of the exterior. At the lower edge of the doors there is a flare which when the doors are closed has the effect of reducing the apparent width of the running boards. This flare acts as an additional weather seal, while when the doors are opened it uncovers the full width of the rubber-sheathed running boards, thus affording a safe step for ingress and egress. Doors are equipped with a new style of rotary, self-tightening lock. Supplementary, button-operated door locks are mounted in the window sills. When the buttons are pushed down the doors are locked both inside and out.

Autothermic pistons have been adopted by Dodge, which are lighter and also carry lighter piston pins. This reduces the loads on main and connecting-rod bearings. Two of the four piston rings, the compression rings, have their surfaces treated to prevent scoring.

The 1939 Dodge, the same as its predecessor, carries a six-cylinder engine of 3¼-in. bore by 4⅞-in. stroke (217.8 cu. in.) which is rated 87 hp., with a compression ratio of 6.5. It has the familiar Chrysler "floating-

Dodge



The "Safety Light" takes the form of a bead which in moving over the dial shows green at speeds up to 30 m.p.h., amber from 30 to 50 and red at speeds exceeding 50.

power" mounting, in which a number of improvements have been made. Other new features of the powerplant are the manifold riser, the downdraft carburetor connected to a double-unit air cleaner and intake silencer, and self-locking tappet screws. Inserts of alloy steel are used for the exhaust valve seats.

The clutch is now provided with an over-center spring, which reduces the pedal pressure required.



Ford • Mercury

IN addition to the 85 and 60 models, the Ford Motor Co. for 1939 announces a new car to be known as the Mercury. It will be mounted on a 116-in. wheelbase chassis and powered with a 3.185 x 3.75 in., 239 cu. in. V-8 engine, developing 95 hp. at 3600 r.p.m. Of almost equal interest is the adoption of hydraulic brakes for all three chassis—the 60, 85 and the new Mercury.

The Mercury powerplant is similar in general design to the familiar Ford 85 but with a larger bore and crankpin of 2.14 in. diameter compared to the 2 in. diameter of the 85. The crankshaft of the 85 has been stiffened by increasing the main bearing diameter from 2.4 in. to 2.5 in. making the main bearing size the same as the new Mercury.

As the result of the new low grille and radiator, fans on both the Mercury and DeLuxe Ford are crankshaft mounted, the design being similar to that used on the Zephyr. This and the new hood design make the distributor more accessible for service. The model 60 engine remains unchanged with the exception of the piston rings which are now thinner and fitted with inner expander rings for improved oil economy. The expanders are used on the two lower rings only. Ring grooves in the light weight cast alloy steel pistons remain unchanged. The ring expanders are also a feature of the 85 and the new Mercury.

The Ford V-8 is offered with the same engine as the DeLuxe or with the economy 60 hp. V-8 engine. However, in that case, the fan is belt driven.

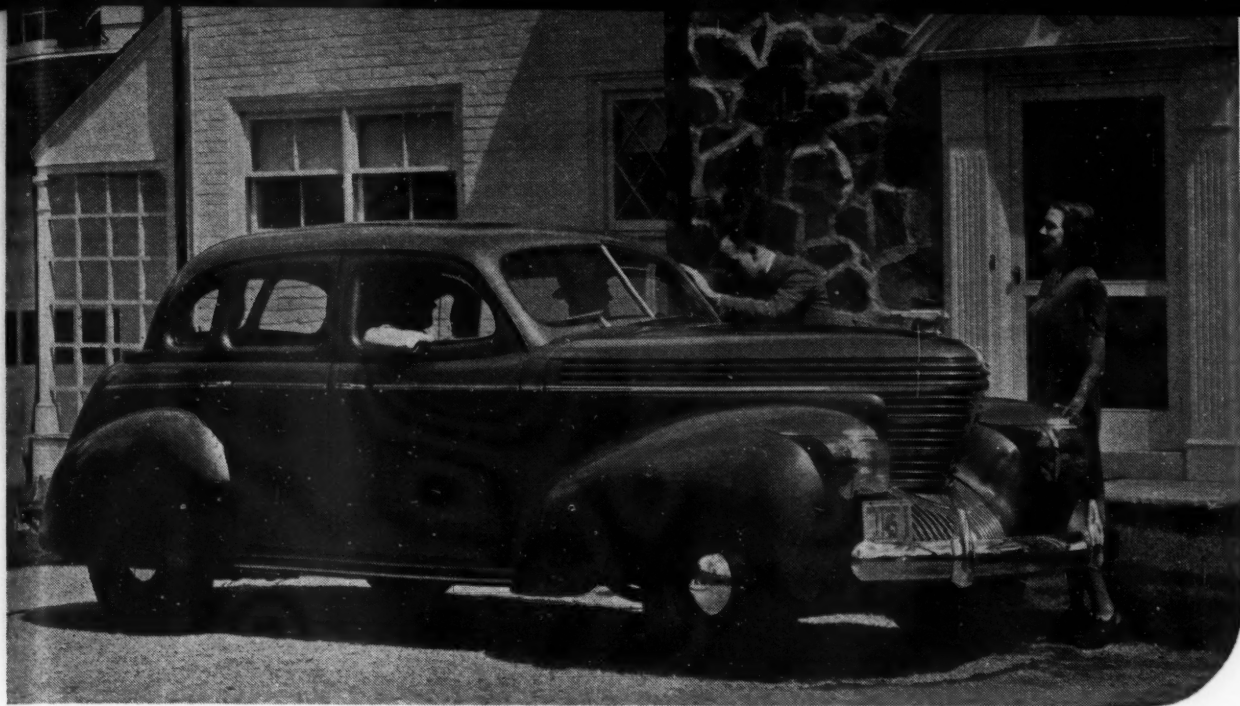
The frame of the new Mercury is entirely new and differs somewhat in design from the one used on the Ford cars. The X-member channels have their flanges turned outward and

(Continued on page 57)



(Top of page) One of four body types of the newest car in the Ford line, the Mercury 8 sedan. With 116 in. wheelbase it measures more than 16 ft. from bumper to bumper. Its V-8 engine develops 95 hp. (Above) Ford V-8 Tudor sedan, available with 60 or 85 hp. engine. Body is all-steel. Equipment includes twin electric horns, dual wipers, ash tray, glove compartment and arm rests.

**Ford enters new price class with Mercury:
hydraulic brakes now on the Ford "family"**



Graham



(Top of page) The 1939 Graham reveals a smoothing and refining of the "Spirit of Motion" styling which was introduced in 1938. Concealed door hinges, rear wheel shields, built-in trunks are part of the equipment included in the lowered price. (Above) Front compartment with custom treatment. It differs from the Special in color of trim, steering wheel, clock, upholstery and other details.

New cylinder head design; running boards replaced by molding; single chassis model

GRAHAM this year has only a single chassis model but offers the customer an option on two mechanical and custom equipment groups, factory installed at a fixed price. The basic model of the line is the 90-hp. Graham Special, to which may be added a supercharger equipment group, a custom equipment group, or both. Thus while only one series is listed in the literature of the company, the purchaser can get a 90-hp. Special, a 90-hp. Custom Special, a 116-hp. Supercharger, or a 116-hp. Custom Supercharger. The basic model, the Graham Special, is available in a four-door sedan, a two-door sedan, or a combination coupe. Detroit delivered prices are \$965 for the four-door sedan and \$940 for the two-door sedan and combination coupe. These prices include such items of equipment as built-in trunks, rear-wheel shields, dual sun visors, dual windshield wipers, right and left arm rests front and rear, two assist straps in rear, ash trays front and rear, bumper guards, etc. The four-door sedans are \$122 below the comparable 1938 models; the other two body models are new, and a price comparison therefore is impossible.

The price to the customer of either the custom-equipment group or the supercharger-equipment group, installed at the factory, is \$130. The combination coupe and the two-door sedan, which will be exhibited at the New York, Toronto and Chicago shows, are expected to be available for delivery shortly thereafter. In the coupe there is room for six passengers under the roof. Access to the rear seat is afforded by folding backs of front seats, which swing forward and inward. Trunk space is larger than in the sedan, and additional room for baggage can be provided. (Continued on page 57)

A NEW V-12 Lincoln-Zephyr for 1939, with refined styling, increased passenger comfort and important mechanical improvements including new hydraulic brakes, has been announced by the Lincoln Motor Co.

The new Lincoln-Zephyr is available in six body types, eight modern colors and a variety of upholstery options. Body types include a sedan with four doors, a coupe-sedan with two doors, a three-passenger coupe, a town-limousine, a convertible sedan and a convertible coupe.

The trim new front end, the sweep of the lengthened hood as it blends into the low, roomy body and the flowing rear deck line unite to create an air of fleetness and grace.

The side view of the car has a pleasing, unbroken smoothness created by the introduction of a new treatment in door design. The doors now carry extensions at their lower edges which conceal the narrow running boards and also serve to keep them clean. The design does away with exposed running boards but retains the added floor strength and body rigidity which they provide. The passenger compartment floor is level with the running boards. This enables passengers to step easily and directly into the car. The graceful lines of the fenders blend smoothly into the body panels. Shields enclose the rear fender openings.

The gear shift lever is removed from the floor and operates under the instrumental panel. The handle is at the driver's right hand, out of the way of front seat passengers. Other controls are within easy reach, recessed in the panel as added safety feature.

Self energizing hydraulic brakes; new rear designed to provide quiet axle operation

New engine cooling efficiency is achieved by the new lower radiator grille and new location of the fan. This is now mounted on the crankshaft behind the radiator grille openings so that the air is drawn directly into the engine compartment.

The new hydraulic brakes provide exceptional stopping ability. This is because they are of the same self-energizing design which proved so successful last year.

The parking brake lever, of new design to allow easier operation, actuates the service brake shoes in the rear wheels through cable-and-conduit control. The mechanism is independent of the hydraulic system.

Other mechanical improvements include a new rubber-cushioned body

mounting which completely insulates the body against road noises transmitted through the running gear. There are also a new and more effective rear engine mounting, a more rigid rear axle differential housing and a heavier torque tube to provide quieter axle operation. Two-speed overdrive axle equipment is available on special order. The rear main bearing oil seal has been redesigned to improve its effectiveness and expanders are used behind all the piston rings with the exception of the top compression ring.

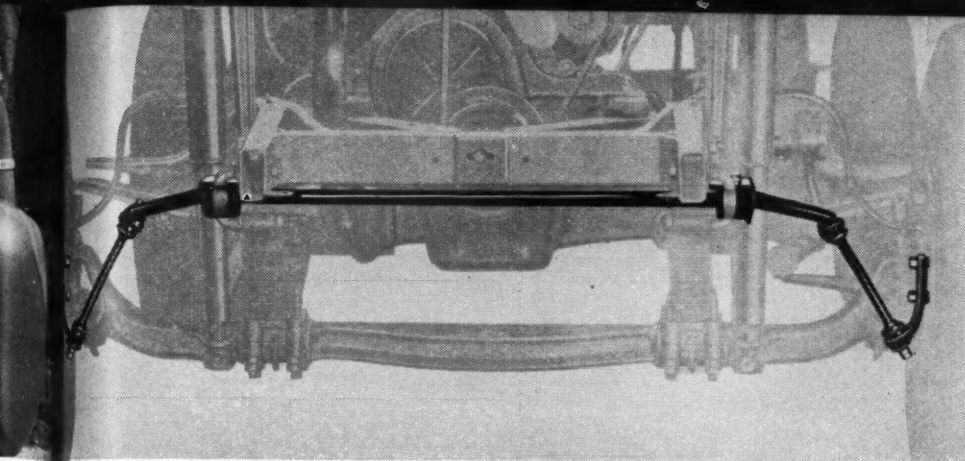
Wheelbase is 125 inches, springbase 136 inches. A blocker type synchronizing unit is used for second and high speeds in the transmission, minimizing clashing during gear-shifting.

Lincoln - Zephyr



(Top of page): Trim new front end of the 1939 Lincoln-Zephyr. Chrome strips relieve unbroken hood side panel.

(Left): Four-door sedan. Door extensions conceal running boards.



By
JOSEPH GESCHELIN

A new 96 hp. six in low price field and Auto-Poise ride stabilization introduced

FOR 1939 the Hudson Motor Car Co. presents three new lines of cars all bearing the Hudson name. They are the Hudson 112 in the lowest price field with 86 hp., mounted on 112-in. wheelbase; a new Hudson six in the low price field with 96 hp., mounted on 118-in. wheelbase, and a new country club series with both six and eight-cylinder engines giving respectively 101 and 122 hp., mounted on 122-in. wheelbase, and a special eight-cylinder custom sedan on 129-in. wheelbase in the moderate price field. Also included are $\frac{1}{2}$ -ton capacity business cars on the 112-in. chassis and $\frac{3}{4}$ -ton capacity on the 96-hp. chassis with 119-in. wheelbase.

All three lines of passenger cars are new and distinctive in their styl-

ing. The treatment of the die-cast radiator grilles is such that the cars are given a modern, low, long fleet appearance.

Important engineering refinements, which materially improve riding comfort, safety, roadability and general performance characteristics of the cars, have been introduced on the new models. Outstanding among these developments is the new ride resulting from an important innovation in chassis stabilization known as Auto-Poise control and also the introduction of the Airfoam seat cushion which is standard equipment on the entire Country Club series and convertible models and optional on the Hudson 112 and Hudson Six closed cars.

The Auto-Poise control derives its

advantages from the fact that complete control over the action of the front wheels and suspension system is established, particularly under conditions of side winds, unequal tire pressures, and rough road surfaces.

The Auto-Poise consists of a bar that is attached to the frame across the front of the chassis with the ends angle backward to form lever arms exactly like the familiar stabilizer. The ends of these levers, however, are connected by suitable links to the wheel spindles. This attachment point is so located that as soon as anything tends to deflect the wheels from the straight ahead position, the bar is twisted torsionally and immediately tends to pull the wheels to center again.

The Airfoam cushions are made from latex and so processed that air can flow through it as through a fabric, thus completely air cooling and ventilating the cushion. They are introduced as a solution to fatigue on long distance drives.

Another innovation is that the gear-shift lever on all models now operates by remote control with the lever beneath the steering wheel. This Handy Shift may be combined with Hudson's "non-freewheeling automatic clutch" which makes it unnecessary for the driver to operate the clutch pedal. The Selective Automatic Shift is continued as optional equipment on all Hudsons except the 112. It is available either with or without the automatic clutch.

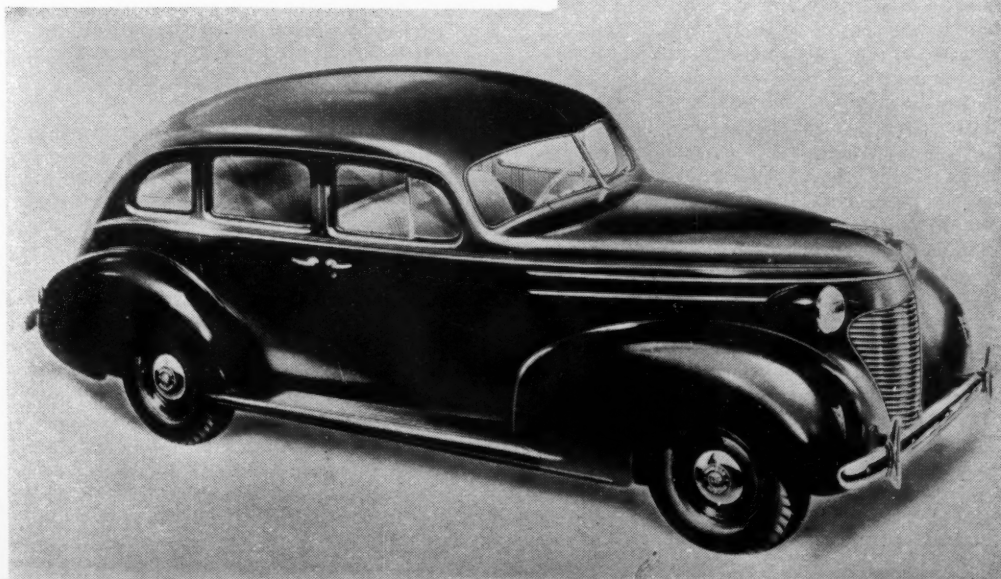
Performance characteristics of the three lines of cars have been generally improved. On the Hudson 112,

(Continued on page 68)

Hudson

(Top of page): Auto-Poise control designed to hold front wheels in true direction regardless of high winds or rough roads.

(Right): Hudson 112, Touring sedan with 86 hp. on 112 in. wheelbase.



A new "airliner" shock absorber and "Weather Eye" air conditioning featured for 1939

[illegible]

Oldsmobile



Olds Six series 60 four-door trunk sedan

Coil springs all around and new six on 115 in. wheelbase offered in 1939 model

FEATUREING Quadri Coil suspension, with coil springs at all four wheels, Oldsmobile has developed a smartly styled line of three models for the new season. The Olds line for '39 comprises three models—Series 60, a small six mounted on 115 in. wheelbase; Series 70, the big Six; and Series 80, the Eight, both mounted on the same new 120 in. wheelbase chassis.

Styling is entirely new with a characteristic die cast front grille and two die cast side grilles faired into the front fender skirts. While the styling is essentially the same on all models, the 70 and 80 feature the new streamline bodies with large glass areas and slender pillars, two inches lower than any previous model and available with or without running boards. The body

for the 60 is smaller, more conventional, and has running boards as standard equipment.

The engine for the small Six is similar in all respects to the engine used in the model 70, except for shorter stroke, and a new crankshaft.

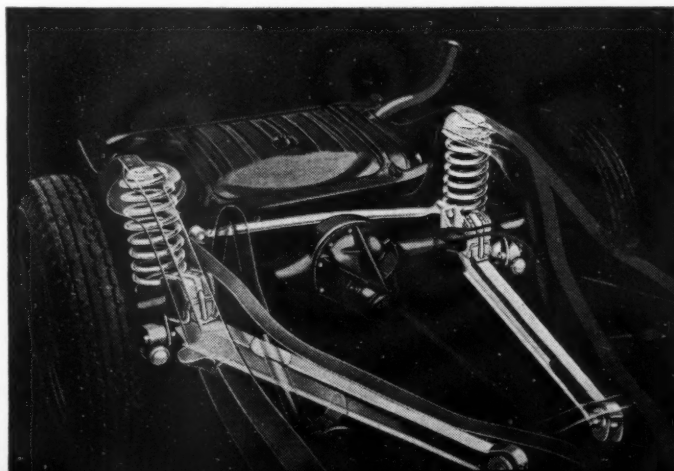
New mechanical features common to all models may be briefly high-spotted as follows—remote gear shift control mounted under the steering wheel in combination with a new transmission provide exceptional ease and smoothness of shifting. The im-

proved Automatic Safety transmission is continued as an optional feature.

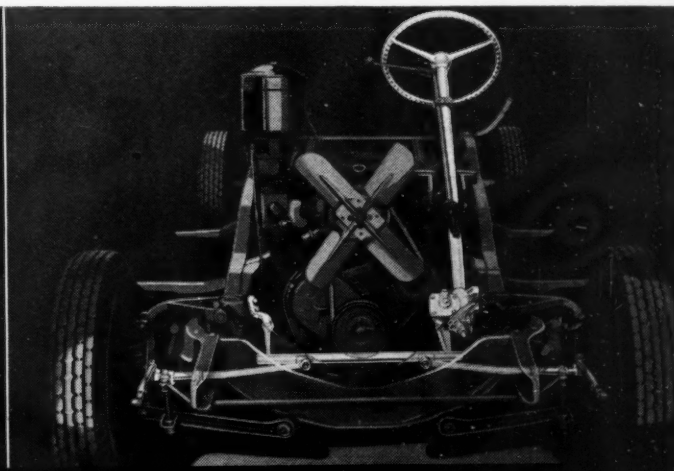
With lower chassis frame and curb entry bodies on the 70 and 80, the hypoid axle with conventional propeller shaft has been adopted as standard on all models.

In addition to the innovations, the chassis has many important improvements including a simplified clutch of conventional design which has less working parts, less service operations, and is said to be most economical to build. (Continued on page 62)

Rear chassis detail of Olds Quadri-Coil springing. Heavy rear stabilizer bar blocks side to side movement.



Dual center control steering. New tie rods are of equal length and weight.

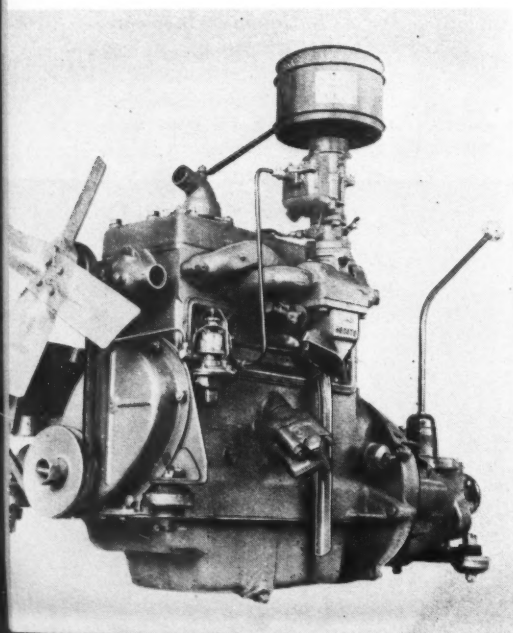


Overland



Willys-Overland Motors, Inc., brings back an old name in a new four-cylinder car

(Above) Two-door sedan model of the new Overland. (Below) Overland engine. New type compression chamber gives a ratio of 6.3. A packless water pump, automatic heat control in the intake manifold, new high lite valves, are other features.



ONCE again the name of Overland is to be found in the list of American made automobiles. The new car, announced by Willys Overland, is powered with a 134.2 cu. in. engine developing 61 hp. at 3300 r.p.m. The Willys, which is continued, has the same size engine but develops 48 hp. at 3200 r.p.m. The new car is of standard tread width and is 180 in. from bumper to bumper, the wheel-base being 102 in., an increase of 2 in. over the Willys.

In appearance the new Overland slip-stream body is marked by a distinctive development in streamlining accentuated by a hood which bears close resemblance to the front of a modern transport air-liner. Ventilating louvers are carried at the front of the hood and in the aprons between the fenders. Headlights are built into the front fenders.

A new type Borg and Beck clutch is featured and the three speed Warner transmission is of the synchromesh type. Drive to the semi-floating rear axle is through Universal Products universal joints. Rear axle reduction is 4.3 on the standard 4-door sedan, with 4.55 to 1 being used on the deluxe jobs.

Braking system is now Wagner Lockheed hydraulic and the nickel

chromium alloy brake drums are 9 in. in diameter. The mechanical hand brake is controlled by a lever under the instrument panel.

In the chassis construction, the K-X type of frame reinforcement is employed. The K-member is located at the front and the X-member mid-way of the frame. To increase riding comfort and reduce the transmission of noises, bodies are mounted on rubber cushions. Spring shackles are also fitted with rubber cushioning elements and an improved type of motor suspension with the supporting members resting on rubber cushions has been developed.

Both front and rear springs are of the conventional semi-elliptic type, with two-way Monroe shock absorbers being employed to control rebound.

In addition to the increased power, the engine is featured by full length water jackets and the aluminum pistons are tin plated to increase their life and reduce the possibility of scuffing.

Electrical units and ignition system are of Auto-Lite manufacture, the generator on the deluxe models being fitted with a voltage regulator, while standard jobs have a third brush unit. Fuel is supplied through a Tillotson

(Continued on page 42)



The Stephen Seth Co., Baltimore, Md., uses Riess Mfg. Co. equipment for checking wheel alignment, truing brake drums and balancing wheels. (Below) Oliver M. Brooks, service manager.

Line Up Profits With Wheels

EVERYBODY has his own idea of just what constitutes good business, but when cars start blowing their horns clamoring to get into an already overcrowded shop on Saturday mornings, and when an ordinary week day brings in anywhere from 80 to 150 cars—that's good business, and no fooling.

Perhaps some shop operators will find it difficult to believe that any shop is that good, but it is easily proved by a visit to Stephen Seth and Co., Baltimore, Md. While Stephen Seth does a full line of repairs (they have a United Motors franchise), Pop Brooks, the service manager, says that a good portion of their success is directly attributable to front wheel alignment and wheel balancing.

Pop Brooks, who has served many "hitches" in the U. S. Navy as chief machinist mate, has done \$87 worth of labor sales himself on the wheel aligning machine during a single day. That's a record of some sort, but it shows what can be done when you know your stuff and have the equipment.

One of the big advantages of wheel alignment and wheel balancing in particular, Brooks states, is that it also sells tires, wheel bearings, grease retainers, wheel straightening, and

also reduces squeaks and rattles. The reason for this is obvious, for a badly out-of-balance wheel is pretty tough on wheel bearings, and when replacing bearings new retainers should always be installed. Furthermore, a good portion of out-of-balance is the result of worn or otherwise defective tires. Of course, such a condition can be overcome by attaching the necessary balance weights, but a better job is to sell and install new tires.

Brooks uses a wheel balancer that checks the wheels for both static and dynamic balance, and makes a charge of \$2.50 for balancing a single wheel, or \$4.00 a pair. The importance of accurate wheel balancing cannot be over-emphasized, Pop Brooks asserts, for it is one of the major causes of shimmy and excessive tire wear. Correct and accurate wheel alignment, proper wheel balancing together with shock absorbers and springs, are the most important factors in steering.

As an indication of the importance of dynamic wheel balancing, 1 oz. of unbalance on a tire 30 in. in diameter, rotating at a speed equivalent to 10 m.p.h., will exert a centrifugal force of 5.3 oz. But at a speed of 50 m.p.h., the centrifugal force will increase to 134 oz. That is approximately 8.5 lb., and you can imagine what that would

do in producing a shimmy. In that connection, it is not unusual to find unbalanced conditions in excess of 1 oz.

With the older types of wheel balancers, it was necessary to determine the size of the weight to be attached by the cut-and-try method. With modern equipment, the size of the weight and its exact location are both indicated by the equipment.

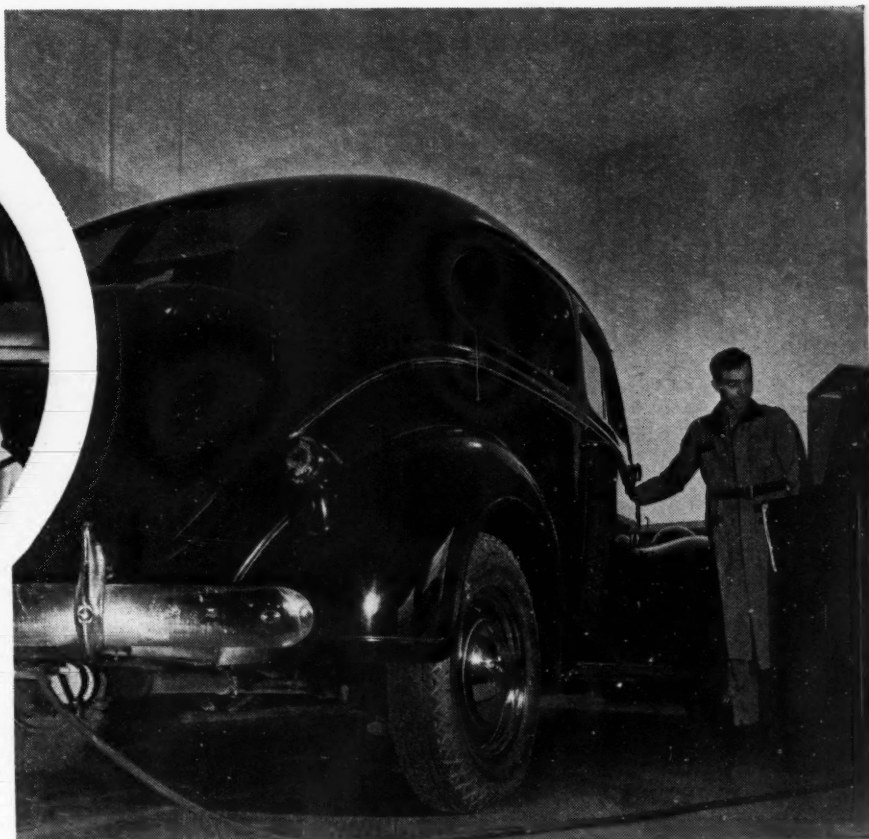




"Stick around, Matilda,—that good looking mechanic is coming over to give me a ring job!"



(Above) W. R. Bamford. (Right) Exhaust analysis being carried out in the service department of Harry Shorter, Inc., Detroit.



Up-to-date Engine Tuning

Modern engines require modern methods of checking to keep them operating properly

By W. R. BAMFORD

Director of Service, Dodge division, Chrysler Corp.

AUTOMOBILE engines of today differ in many respects from the earlier power plants; they are lighter than formerly, they produce more power, operate at higher speeds, are more flexible in performance and prove decidedly more economical in operation.

Since these engine qualities are dependent not on one or two but on a variety of factors, it follows that up-to-date engine maintenance work must be so thorough and so comprehensive as to insure a complete and satisfactory job.

Engine tune-up now calls for the checking up of battery condition and line voltage, the tightening of cylinder

heads and manifold studs or nuts, a vacuum test for general engine efficiency, compression tests for all cylinders, dressing and adjusting of distributor points, checking of distributor caps and rotors for cracks or burned tracks, setting of ignition timing, cleaning and gap-setting of spark plugs, clearing of fuel lines, checking of sediment traps and air cleaners on carburetors and oil-filler pipes, examination of carburetor float levels and adjusting carburetors to seasonal needs and, lastly—a final vacuum test to make certain that all the various service operations have been properly performed.

Where specific complaints are

named by the customer, such as difficult starting of a hot engine, poor fuel economy, sluggish acceleration, etc., additional attention to the electrical equipment and fuel system may be the remedies. It must be understood, however, that a comprehensive tune-up invariably is more satisfactory to every one concerned, as it insures a more definite correction of the difficulty.

Experience of many service experts and mechanics reveals that, contrary to the notions of many car owners and drivers, the carburetor is seldom involved in complaints such as are listed above. Many carburetors are removed and overhauled when the real difficulty is later found elsewhere.

The electrical and fuel systems, while complex in appearance, are in reality very simple from the maintenance standpoint.

The following comments are intended to provide an easily followed, orderly procedure for remedying many of the more commonly encountered difficulties:

CARBURETOR — Complaints of difficulty in starting the engine, poor fuel economy, sluggish acceleration, etc., which may be traced to carburetion.

(Continued on page 60)

Service Hints

from

The Factories

Oil Slinger

After Chevrolet Engine No. 1816342, the oil slinger between the harmonic balancer hub and the crankshaft gear; also the trough which is welded on the inside of the timing gear cover around the oil seal assembly, will be eliminated.

This change was made to allow more oil at the seal to prevent burning of the seal, which results in oil leakage.

When oil leakage occurs at the timing gear cover oil seal on engines previous to the above number, it will be necessary to replace the seal assembly and cut down the oil slinger to approximately 2 inches in diameter so that it will act as a spacer between the crankshaft gear and harmonic balancer hub.

Metering Rod Drag On Hudson Carburetors

In some instances the metering rod rubs against the metal dust cover. There is always a mark on the inside of the dust cover if this condition exists.

To correct this condition, remove the hair pin spring from the metering rod pin and file about 1/32 in. off the length. The hair pin can be eliminated.

Chrysler Economy in Altitude

To remedy a rich condition at altitudes about 3,000 feet in Chrysler, DeSoto, Dodge and Plymouth car-

buretors, engineering has released a spring, 61-134, which brings the vacuum step-up in at a speed of 66 to 68 m.p.h.

Springs 61-118, 61-146 and 61-135, used for the last few years, when used in altitudes over 3,000 feet, actuate the vacuum step-up at a speed of 45 to 55 m.p.h.

Hence, any dealer complaining of economy in altitude can, in addition to the lean jets provided, install 61-134 step-up springs.

Brake Squeaks

In making corrections for squeaking brakes on Chevrolet cars it is important that the lining should be inspected before being cleaned off. If there is any misalignment it will be shown on the linings. The parts that are not contacting the drum will have some brake lining dust on them. The lining should be free of grease or oil and should not be pitted from foreign material such as stones, metal, etc. Linings should not be buffed or changed on account of being glazed as this is a normal condition.

The shoes should be checked for alignment making sure that they are not cocked. The shoes should be against the backing plate (check with a .002 in. feeler). It may be necessary in some cases to bend the anchor plate to correct this condition. Conical springs should be tight; linkage should be free.

Front Fender Rattles—1938 Models

Insufficient clearance between the front fender shields and the steering knuckle support arm bracket on Studebaker 1938 Models may cause a rattle at this point. The correction for a condition of this kind is to bend the lower part of the shield inwardly sufficient to provide proper clearance.

Excessive Ping on Chevrolet 1938 Carburetor 391S

To correct, service procedure is as follows:

Set octane selector to zero. Adjust distributor with neon timing light to steel ball in flywheel. Test car on road with engine at normal operating temperature. Accelerate from 10 m.p.h. with wide open throttle and observe spark ping. Advance or retard spark with octane selector to give a slight ping. Adjustment can be as much as 10 deg. depending upon



In the material receiving department at Pontiac Motors every valve is inspected for the accuracy of its stem. With this finely calibrated instrument the operator, Alice Bertram, examines each valve to see that the diameter is correct and that it is not oval or out of round.

type or grade of fuel used and altitude of road.

After this, when accelerating from a constant speed of about 20 m.p.h., excessive ping at the start of acceleration which does not remain for entire accelerating period, is due to "time lag" of vacuum control in retarding ignition. To reduce this "time lag," remove brass fitting in carburetor body that attaches to vacuum line. On later models, opening in the body is rectangular and no adjustment should be made. In early models, opening is a small round hole. Drill first with a No. 52 (.0635 in.) drill and then with a No. 46 (.081 in.) drill.

Remove vacuum line fitting at diaphragm and drill out to No. 46 (.081 in.).

About March 15 a 3/16 in. vacuum line with proper fittings went into production instead of the 1/8 in. line. This is an improvement to cut down "time lag."

Overdrive Transmission Lubrication Specifications Change—1938 Models

The revised lubrication specifications for the overdrive transmission on the 1938 Studebaker series cars is as follows:

Use only a HIGH-GRADE MINERAL OIL GEAR LUBRICANT of S.A.E. No. 90 for both winter and summer. Gear lubricant containing any extreme pressure ingredients such as lead, sulphur, or chlorine compound SHOULD NOT be used. If the high-grade mineral oil gear lubricant is NOT AVAILABLE use an S.A.E. No. 50 engine oil for winter and S.A.E. No. 70 engine oil for summer.



"If you ask for a demonstration at six, I think my girl can bring a friend along!"



THE READERS' CLEARING HOUSE

of

Service Men's Queries

HARD STARTER

We have a 1938 Buick Century that no one seems to be able to make run properly. Some times it is very hard to start—when it finally starts it may run perfectly and then again it chokes and sputters like a cold engine even after running it three or four miles. Then, by throwing it out of gear and racing the motor like in the warming process, it will run perfect again. We have changed jets in the carburetor, put on a new carburetor, installed new automatic choke and new distributor.

Engine also spits and coughs on almost every acceleration and seems to choke down on hills. Any suggestions you can offer will be appreciated. Al Thuet, Jr., Oasis Super-Service, 24th and East Streets, Golden, Colo.

THERE are several conditions which might contribute to this type of trouble and my first suggestion is that you carefully check the carburetor.

Cases have been reported in which the carburetor would drain itself dry overnight and, therefore, would cause hard starting difficulties in the morning. This has been due primarily to a leak at the lead gasket under the main discharge jet. I have heard of several cases in which this condition existed and merely by removing the main discharge jet and replacing the lead gasket, the trouble has been eliminated. The fact that you have installed a new carburetor in this car does not remove the carburetor from suspicion and, if you have not already done so, I suggest that you check it.

Insofar as performance is concerned on the road, this particular model is unusually sensitive to correct ignition timing and you cannot be too careful in seeing that the ignition timing is exactly right. An incorrect setting will result in poor idling performance, poor acceleration at top speed and, in fact, a generally poor operation

(Continued on page 33)

BILL TOBOLDT, Editor of MOTOR AGE, conducts the Readers' Clearing House. He presents some of the thousands of questions asked by readers of MOTOR AGE together with a practical analysis of the difficulties in his replies. You, too, are cordially invited to send us your problems.

PARTS NUMBERS AND PRICES

Hudson—Series 89—Model 112—6 Cylinder—1938

Front Axle

Mfr's Part No.	No. Per Car	List Price Each
156804—Center	1	\$17.50
155264—Knuckle, L. (early)	1	5.00
155482—Knuckle, R. (late)	1	5.00
154490—King pin	2	.90
152721—King pin bush., up.	2	1.15
152723—King pin bush., low.	2	.35
103—Pin thrust ball	14	.35
71154—King pin lock pin	2	.05
153474—Tie rod only	1	1.50
154995—End assembly, L.	1	2.00
156606—Knuckle arm, L.	1	3.00
154930—Knuckle arm, R.	1	1.50
155261—Torque arm	2	5.50
156461—Front wheel	2	6.75
156764—Front hub & drum	2	6.50
15118—Wheel brg. cone, in.	2	2.31
15250—Wheel brg. cup, in.	2	.96
09078—Wheel brg. cone, out	2	1.61
09195—Wheel brg. cup, out	2	.65
43797—Grease retainer	2	.15
40172—Grease deflector	2	.10
156932—Lining, set (4 whl.)	1	6.50

Steering

156652—Drag link assembly	1	3.75
156653—Drag link only	1	3.00
156659—Ball seat	2	.10
156658—Seat spring	2	.10
156787—Pitman arm	1	1.50
157113—Cross shaft	1	5.75
157109—Gear housing	1	3.25
157117—Tube and worm	1	4.50
5BC—Worm brg. cone	2	.85
6A—Worm brg. cup, up.	1	.69
6C—Worm brg. cup, low.	1	1.50
156790—Jacket tube	1	1.25
40783—Jacket tube bush.	1	.25
155585—Steering wheel	1	5.00

Cooling

156709—Rad. core assembly	1	32.50
130169—Rad. shell & grille	1	15.00
130467—Rad. center molding	1	.75
155709—Thermostat unit	1	2.00
155284—Water pump assem.	1	10.00
150215—Water pump body	1	4.75
150224—Pump impeller	1	1.50
150226—Shaft and hub	1	1.25
150228—Shaft bushing	2	.50
155290—Shaft oil seal	1	.10
150232—Thrust washer	1	.25
150233—Oil seal spring	1	.05
150235—Seal ret. spring	1	.02
150234—Spring washer	1	.05
45975—Fan blades	2	.30
150242—Fan belt	1	1.35

Fuel and Exhaust Systems

156712—Carburetor assem.	1	.....
157145—Carburetor assem.	1	.....
130261—Choke wire	1	.75
156703—Fuel pump assem.	1	.....
155270—Inlet manifold	1	5.00
153152—Exhaust manifold	1	4.50
156844—Muffler	1	2.75
156849—Tail pipe	1	1.75
156850—Exhaust pipe	1	2.00

Engine Gaskets

40710—Carb. to mani.	1	.11
156704—Fuel pump	1	.05
42246—Exh. pipe flange	1	.05
152539—Inl. mani. to block	1	.20
153155—Exh. mani., F.	1	.15
153156—Exh. mani., C.	1	.15
153157—Exh. mani., R.	1	.15
48590—Inl. to exh. mani.	1	.05
152612—Cylinder head	1	.90
44734—Oil pan	2	.15
40150—Timing case cover	1	.30
152649—Valve side plate	2	.10
150379—Water outlet	1	.05
150222—Pump to cylinder	1	.02
37196—Water jacket cover	1	.15

Engine Parts

155204—Block with pistons, pins and rings	1	90.00
156627—Cylinder head	1	9.00
156641—Oil pan	1	5.00
156639—Crankshaft	1	37.50
152644—Camshaft	1	8.75
155480—Vibration damper	1	6.50
150100—Flywheel	1	8.50
44729—Flywheel gear	1	2.25
47097—Piston	6	3.00
43452—Compression ring	12	.25
43456—Oil ring	12	.50
37029—Piston pin	6	.45
33332—Piston pin bushing	6	.20
60063—Piston pin retainer	12	.02

Engine Parts—continued

Mfr's Part No.	No. Per Car	List Price Each
156617—Con. rod, L. H.	3	\$3.95
155357—Inlet valve	6	.65
155360—Exhaust valve	6	.95
45586—Valve spring	12	.25
155363—Valve spring seat	12	.05
45587—Surge suppressor	12	.05
60104—Valve key	12	.30
155359—Inlet valve guide	6	.30
155362—Exhaust valve guide	6	.30
45443—Valve lifter only	12	.75
61512—Valve adj. screw	12	.11
45444—Valve lifter guide	12	.35
151540—Timing case cover	1	.75
150566—Crankshaft gear	1	1.50
150565—Camshaft gear	1	4.75

MAIN BEARINGS

37234—No. 1 upper	1	1.15
37235—No. 1 lower	1	1.15
44673—No. 2 upper	1	1.30
44674—No. 2 lower	1	1.30
37017—No. 3 upper	1	1.55
37018—No. 3 lower	1	1.55

Engine Oiling

44686—Oil pump assembly	1	5.00
44687—Oil pump body	1	1.50
44693—Shaft bushing	1	.45
44690—Plunger	1	.75
44692—Pump shaft	1	.50
43723—Pump drive gear	1	.50
45200—Relief valve assem.	1	1.75
40296—Relief valve body	1	.85
45201—Plunger	1	.65
37787—Relief valve spring	1	.05
37270—Relief valve ball	1	.05

Clutch

156633—Housing	1	7.00
41258—Release bearing	1	2.95
45142—Disk & corks	1	4.50
45152—Press. plate only	1	5.50
45148—Pressure spring	9	.15
155224—Pressure spring, in.	3	.10
47291—Spline shaft	1	7.50
3200—Pilot bearing	1	1.70
3205—Spline shaft brg., R.	1	3.00

Transmission

156662—Case	1	10.00
155529—Countershaft	1	2.25
154553—CS. bushing, F.	1	1.25
150149—CS. bushing, R.	1	.65
155533—CS. drive gear	1	3.00
155534—CS. 2nd gear	1	2.25
155535—CS. reverse gear	1	2.25
155524—Mainshaft	1	2.50
44169—Mnshft. pilot brg.	26	.05
42108—Mnshft. brg., R.	1	2.70
155527—Low gear	1	2.75
155013—Second speed gear	1	6.50
45018—Second gear bush.	1	1.25
150197—Reverse sliding gear	1	1.75
151184—Idler gear shaft	1	.45
46444—Idler gear bush.	2	.50
155526—Shift sleeve	1	1.85
155754—Shift bar, low	1	.50
155755—Shift bar, 2nd	1	.....
150204—Shift fork, low	1	.50
152698—Shift fork, 2nd	1	1.25

Universals

150182—Joint assem., front	1	11.15
155536—Transmission flange	1	2.50
150184—Front yoke	1	4.15
150194—Cross	2	1.95
43809—Bearing assem.	8	.60
43521—Bearing lock ring	8	.05
150723—U bolt	4	.15
155385—Pinion shaft flange	1	2.50
155018—Propeller shaft	1	11.00
155030—Shaft & rear joint	1	12.50

Rear Axle

156750—Housing	1	.....
152655—Diff. carrier assem.	1	45.00
44580—Diff. carrier & caps.	1	8.25
44584—Diff. carrier gasket	1	.20
150072—Differential case	1	5.50
40191—Differential pin	1	.45
152677—Differential pinion	2	.70
42272—Diff. side gear	2	1.60
44539—Pinion & ring gear	1	13.75
71178—Ring gear screw	6	.38
155384—Pinion oil seal	1	.80
3199—Pinion cone	2	3.74
3120—Pinion cup	2	2.11
71710—Differential bearing	2	5.60
150066—Grease retainer, out.	2	.35
156754—Axle shaft	2	5.00
156756—Oil seal, in.	2	.35
2581T—Rear bearing cone	2	3.09

Rear Axle—continued

Mfr's Part No.	No. Per Car	List Price Each
2523—Rear bearing cup	2	\$1.79
156767—Rear hub & drum	2	.....
156932—Lining (4 whl.)	1	6.50

Front Springs

157050—Assembly (left)	1	6.00
153224—Front shackle, R.	1	.75
153231—Shackle bushing, R.	3	.40
153232—Shackle bushing, L.	1	.40
153237—Rear bolt	2	.48
45294—Rear bolt bushing	2	.25
156913—Spring clip, F.	2	.26
43622—Center bolt	2	.....

Rear Springs

157082—Assembly	2	7.50
153238—Front bolt	2	.40
153239—Front eye bushing	2	.25
153226—Shackle, R.	1	.75
153231—Shackle bush., R.	3	.40
153232—Shackle bush., L.	1	.48
45296—Spring clip	4	.40
157092—Center bolt	2	.20

Electrical

1GW4104A—Dist. assem.	1	9.35
1GB1240—Distributor cap	1	.90
GE40—Distributor gear	1	.50
1GW3028S—Contact point, set	1	.90
1GB1239—Rotor	1	.35
1GB1025J—Condenser	1	.75
1G4650—Coil & switch	1	7.10
47630—Ignition switch	1	.75
155685—Lighting switch	1	1.00
153213—Stop light switch	1	.50
SW4010—Starter switch	1	.90
153212—Dimmer switch	1	.75
130461—Tell-tale light	1	.35
GBM4609A—Gen. assembly	1	22.00
GBM2012AS—Gen. brush, set	1	.75
GBM2065—Gen. arm. exch.	1	4.85
GBF79—Comm. end bearing	1	.10
3203—Drive end bearing	1	1.15
GAM1005K—Gen. field, set	1	2.50
CBA4003—Cutout relay	1	2.10
MAJ4057—Starter assembly	1	25.00
MAB12—Starter brush	2	.25
MZ1034—Starter brush	2	.25
MAJ2062—Starter armature	1	8.55
MAB124—Drive end bushing	1	.15
EBA5—Starter drive assem.	1	5.80
EB8605—Starter spring	1	.55
130233—Headlamp assem., L.	1	8.50
130247—Headlamp body, L.	1	3.00
130606—Headlamp reflector	2	1.75
130248—Headlamp door	2	.40
130609—Headlamp lens	2	.....
130501—Rear lamp (pri.)	1	2.75
121549—License lamp (pri.)	1	2.25
130505—Rear lamp lens	1	.45
156955—Bat. to switch cable	1	1.00
153629—Bat. ground cable	1	.50

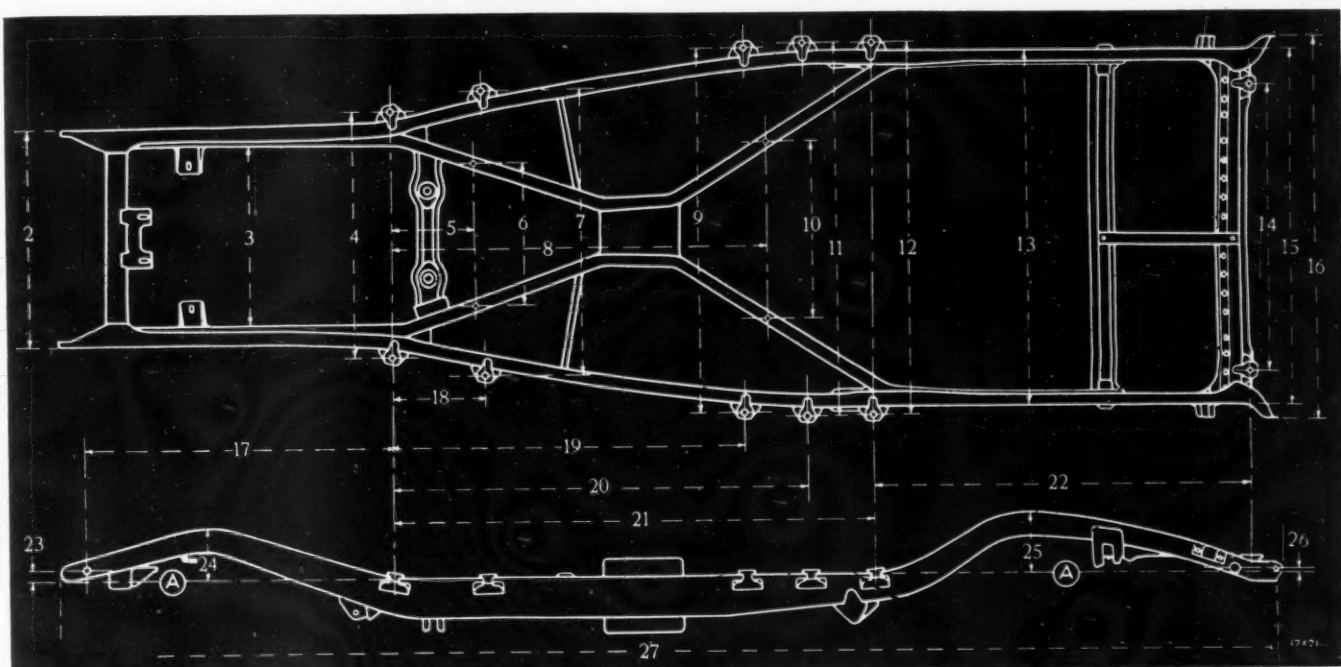
Body and Sheet Metal

(4-door sedans) (in prime)

130003—Front fender, L.	1	21.00
130015—Rear fender, L.	1	11.00
130033—Hood top panel	1	17.50
130035—Hood side panel, L.	1	5.00
130023—Cowl side panel, L.	1	.....
116090—Cowl vent. seal	1	.15
125305—Door panel, L. F.	1	12.50
125213—Door panel, L. R.	1	10.00
125327—Door, stripped, L. F.	1	25.00
125387—Door stripped, L. R.	1	25.00
120093—Door pillar, L. cen.	1	2.75
130273—Quarter panel, L. R.	1	20.00
125030—Roof panel, metal	1	37.50
130210—Trunk lid assem.	1	.....
112753—Door glass reg., L.F.	1	2.00
120291—Remote cntrl., L. F.	1	.50
130196—Door handle, F. out.	2	1.00
130197—Door handle, R. out.	2	1.00
130046—Instrument panel	1	.....
130089—Running board, L.	1	8.50
125756—Front bumper bar	1	7.50
130133—F. bmpr. back bar, L.	1	2.25
130136—Rear bumper bar	1	6.00
130135—R. bmpr. back bar, L.	1	2.25

Miscellaneous

150657—Hand brake ratchet	1	.75
151073—Master cyl. cup	1	.20
151082—Check valve	1	.20
150761—Master cyl. assem.	1	5.50
151095—Wheel cyl. cup	8	.15
156895—Wheel cyl. assem. L.	2	2.50
156799—Wheel cyl. boot	8	.15
156701—Chassis frame	1	45.00
156807—Front cross member	1	1.25
156778—Shock Absorber F.	2	6.00
156779—Shock absorber R.	2	6.00



(Dimensions given in inches)

A—Top line of frame
2—29 $\frac{1}{8}$ (29 $\frac{1}{8}$ —7 pass. sedan)
3—24 $\frac{1}{8}$
4—33 $\frac{1}{8}$
5—12 $\frac{1}{8}$
6—18 $\frac{1}{8}$
7—38 $\frac{1}{8}$
8—50 $\frac{1}{8}$ (63 $\frac{1}{8}$ —7 pass. sedan)
9—49

1938 Plymouth P-5 & P-6 Frame Alignment

10—22 $\frac{1}{8}$ (26 $\frac{1}{8}$ —7 pass. sedan)
11—50 $\frac{1}{8}$ (50 $\frac{1}{8}$ —7 pass. sedan)
12—50 $\frac{1}{8}$ (50 $\frac{1}{8}$ —7 pass. sedan)
13—48 $\frac{1}{8}$ (48 $\frac{1}{8}$ —7 pass. sedan)
14—38 $\frac{1}{8}$
15—48 $\frac{1}{8}$ (48 $\frac{1}{8}$ —7 pass. sedan)
16—51 $\frac{1}{8}$ (51 $\frac{1}{8}$ —7 pass. sedan)
17—41 $\frac{1}{8}$

18—12 $\frac{1}{8}$
19—47 $\frac{1}{8}$
20—56 $\frac{1}{8}$
21—65 $\frac{1}{8}$ (85 $\frac{1}{8}$ —7 pass. sedan)
22—51 $\frac{1}{8}$
23—13 $\frac{1}{8}$ (11 $\frac{1}{8}$ —7 pass. sedan)
24—7 $\frac{1}{8}$
25—8
26— $\frac{1}{2}$ (1 $\frac{1}{8}$ —7 pass. sedan)
27—164 $\frac{1}{8}$ (184 $\frac{1}{8}$ —7 pass. sedan)

(Continued from page 31)

throughout the entire speed range. The principal cause of stalling, particularly in traffic, is a high float level in the carburetor. This point must be carefully checked because, in addition to causing stalling, it will cause hard starting troubles.

The fact that the motor does not respond to an acceleration would seem to indicate a failure of the accelerating pump to deliver the charge when called upon. This could be due to a poor pump plunger or to improperly operating valves in the accelerating well. I do not think that you can assume that these conditions do not exist simply because you have a new carburetor on the car. There have been numerous instances in which these troubles have been found when a new carburetor was installed in an effort to overcome just this condition. It is necessary, therefore, to thoroughly check the carburetor and particularly the points mentioned above and by doing so, I feel quite sure you will locate the cause of your trouble.

Another point which is a remote possibility, is that the carburetor heat control shaft may be frozen so that it is not allowing proper operation of the heat control valve.

BRAKE ADJUSTMENTS

I have trouble adjusting brakes on 1936 Studebakers after I reline them. I have tried two or three types of brake lining. I tried setting anchors and bleeding the lines. I can't get

enough brake on the rear wheels—the brakes I do get are 80 per cent on the front and the two front brakes are not equalized.

This car has the step-down cylinders and $\frac{1}{4}$ in. lining. What would you advise? Also, I do not get over a $\frac{1}{4}$ pedal although I can pump it up. Eddie Dolan, 4442 Washington Blvd., Chicago, Ill.

THE first thing I would check on this job is to be sure that the wheel cylinders are the proper size—front and rear. The front and rear cylinders are not the same size and if, through error, one of the rear cylinders has been put on the front you would have difficulty and, in fact, it would be impossible for you to equalize the front brakes and to get proper braking in the rear. The cylinder bore sizes of the wheel pistons are marked on the cylinder casting and to assist you in locating the proper cylinders, the front wheel brake cylinders have bore sizes of 1 $\frac{1}{8}$ in. for the forward piston and 1 in. for the rear ward piston. The rear brake cylinder bore sizes are 1 $\frac{1}{4}$ in. for the forward piston and 1 in. for the rear piston. It is also important to see that the larger bore of the wheel cylinder is placed in the backing plate so that it will operate the forward shoe.

Having satisfied yourself that the correct wheel cylinders are used and that the cylinders themselves are not scored and that the cups and pistons are in good condition so that there is no leak or loss of compression, I would

then check the location or adjustment of the anchor pin. This is particularly necessary after the brake shoes have been relined. The proper adjustment is to loosen the anchor pin lock nut on the rear of the backing plate and turn the eccentric anchor pin and at the same time rotating the shoe adjustment cam until the shoes are set so that there is .005 in. clearance at the lower end of the shoe and .010 in. clearance at the upper end. This measurement should be taken with the feeler gage placed about 1 $\frac{1}{2}$ in. from the end of the lining. If you will perform this adjustment pretty carefully to be sure that you get the proper clearance at the upper and lower ends of the shoe and then lock the anchor pins in place, I feel quite sure that you will get the proper brake adjustment.

LOSES OIL PRESSURE

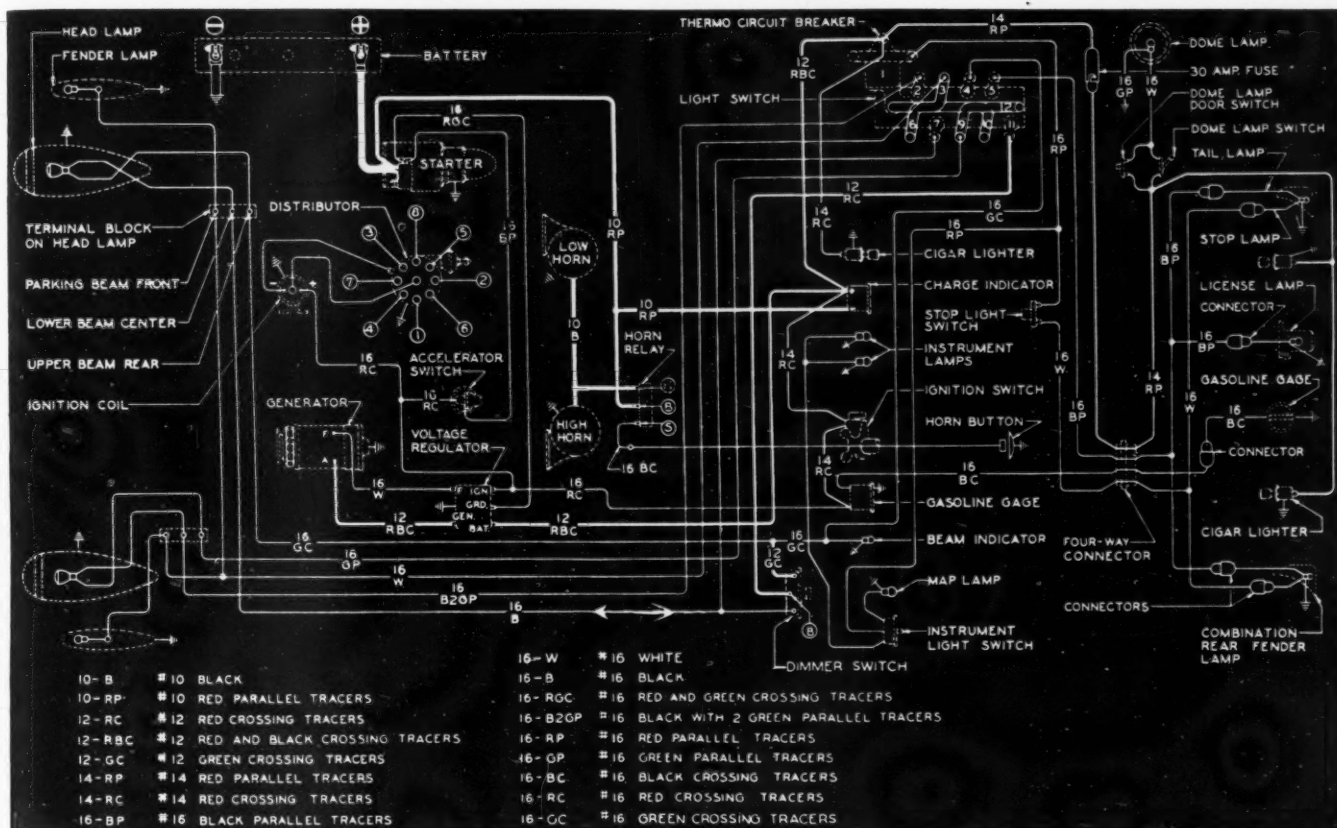
I am having some trouble with oil pressure on a 1935 Reo Flying Cloud. Now here's what happens—When you go down or up a hill, the oil pressure drops back to almost zero. Then, when you get back on level road in just a few seconds the pressure jumps back up to 40 or more. Now as long as the car is on level road, pressure is O.K. I have had the pan off and cleaned the screen, also discovered water was leaking in the oil. I believe this is from a bad head or gasket.

There is a plate that covers up half the screen on the pump and the open
(Continued on page 35)

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM			CHEVROLET (Cont.)			FORD (Cont.)			HUPMOBILE			NASH (Cont.)			PACKARD (Cont.)		
Std. Coupe	399	1250	Master De Luxe			De Luxe 85 Coupe			Big Six-922E De Luxe Sedan	995		Ambassador Six			Twelve-1707 Coupe, 2-4p	4140	5400
Spec. Roadster	449	1200	Bus. Coupe	684		Tudor Sedan			Custom Sedan	1095		Bus. Coupe, 2d			Tour. Sedan, 4d	4155	5670
Pickup Truck	465	1245	Coach	699		Fordor Sedan						Sedan, 2d			Coupe, 5p	4185	5425
DeLux Coupe	469	1265	Coupe, 2-4p	715		Conv. Coupe			Eight-925H De Luxe Sedan	1145		A. P. Coupe			Club Sedan	4255	5595
Std. Roadster	479	1200	Town Sedan	720		Conv. Coupe			Custom Sedan	1245		Sedan, 4d, trk			Conv. Cpe., 2-4p	4375	5545
Panel Truck	479	1330	Sedan	745								Cabriolet, A. P.			Formal Sedan	4865	5745
Std. Sed., 4p	497	1270	Sport Sedan	766											Victoria	5230	5570
Std. Del.	497	1265													A-W Cabriolet	6730	4950
DeL. Roadster	525	1200															
DeL. Del.	549	1265															
DeL. Sed., 4p	549	1270															
Stat. Wagon	565	1400															
BUICK			CHRYSLER			GRAHAM			LA SALLE			OLDSMOBILE			PLYMOUTH		
Series 40			Royal Six Coupe	918		Special 96	940		Coupe	1240		Six-Series 60			Roadking—P-7		
Bus. Coupe	894	3322	Vict. Coupe	970		Comb. Coupe	940		Sedan, 2d	1280		Bus. Coupe	777		Coupe	645	
Sport Coupe	950	3372	Brougham	975	3215	Sedan, 2d	940		Sedan, 4d	1320	3740	Club Coupe	833		Sedan, 2d	685	
Tour. Sedan, 2d	955	3417	Sedan	1010	3275	Sedan, 4d	965		Conv. Coupe	1395		Sedan, 2d	830		Tr. Sed., trk., 2d	699	
Tour. Sed., 4d	996	3482							Conv. Sedan	1800	3780	Sedan, 4d	889	3000	Sedan, 4d	726	2839
Conv. Coupe	1077	3642	Royal Windsor Six			Custom 96									Tour. Sed., 4d	740	2829
Sport Phaeton	1406	3452	Sedan	1075		Comb. Coupe											
Series 60						Sedan, 2d			LINCOLN			Six-Series 70					
Sport Coupe	1175	3637	Imperial Eight	1123		Sup'charger 97			V12—138 in.	4900	5735	Bus. Coupe	833		De Luxe—P-8		
Tour. Sed., 2d	1205		Coupe	1150		Comb. Coupe			Sedan, 4d	5300		Club Coupe	830		Coupe, 2-4p	725	
Tour. Sed., 4d	1246	3782	Vict. Coupe	1150		Sedan, 2d			Conv. Roadster	5300		Sedan, 2d	901		Sedan, 2d	755	
Conv. Coupe	1343	3712	Brougham	1155		Sedan, 4d			Coupe	5300	5435	Sedan, 4d	952	3180	Sedan, 2d	761	
Sport Phaeton	1713	3917	Sedan	1198	3675	Custom			Wilby Coupe	5900	5615		1045		Tour. Sedan, 2d	775	
Series 80						Sup'charger 97			Brunn Victoria	5900	5530				Sedan, 4d	791	
Tr. Sed., 4d	1543	4247	New Yorker Imp. 8	1298		Comb. Coupe									Tour. Sedan, 4d	805	2919
Sport Sedan, 4d	1543		Sedan			Sedan, 2d			V12—145 in.	5100	5880	Bus. Coupe	840				
Formal Sed., 4d	1758	4312	Saratoga Imp. 8			Sedan, 4d			Limousine	5200	5970	Club Coupe	831		Coupe, 2-4p	755	
Sport Phae., 4d	1983	4392	Sedan	1443		Sedan, 4d			Conv. Sed. LeB.	5800	5670	Sedan, 2d	901		Sedan, 2d	761	
Series 90									Wilby Tour. Sed.	5900		Conv. Coupe	1045		Tour. Sedan, 2d	775	
Tr. Sed., 4d, 6p	2074	4568	Custom Imp. 8			HUDSON			Conv. Sed. LeB.	6000	5780				Sedan, 4d	791	
Tr. Sed., 4d, 8p	2350	4608	Sedan			112-90			Jud. Berline	6000	5770	Eight-Series 80			Tour. Sedan, 4d	805	2919
Limo., 4d, 8p	2453	4653	Limousine			Coupe, 3p			Jud. Berline	6100	5840	Bus. Coupe	923				
CADILLAC						Brougham			Wilby Limo.	6200	6140	Club Coupe	971		PONTIAC		
Series 61			DE SOTO			Vict. Coupe			Jud. Sed. Limo.	6300	5950		922		Quality Six		
Coupe	1610		De Luxe			Tour. Brougham			Brunn Cabriolet	6900	6010		1043	3340	Coupe	758	2880
Sedan, 4d	1680	3770	Bus. Coupe	870		Sedan	2712		Brunn Cabriolet	7000	6030		1119		Sport Coupe	809	2930
Conv. Coupe	1770		Coupe, 2-4p	925		Tour. Brougham			Wilby Sport Sed.	7000	6030				Tour. Sedan, 2d	820	2970
Conv. Sedan	2170	3810	Tour. Sedan, 2d	930	3129	Sedan			Brunn Brougham	7000	6120				Tour. Sedan, 4d	866	2995
Series 60-S			Tour. Sedan, 4d	970	3174	Conv. Coupe			Brunn Tour. Cab.	7220	5870						
Tour. Sedan, 5p	2090	4110	Limousine, 7p			Conv. Brougham			Wilby Panel Bro.	7400							
Series 75									LINCOLN-ZEPHYR								
Tour. Sedan, 5p	2995	4785	Custom			112-98			Standard								
Bus. Tr. Sed., 8p	3105	4865	Coupe	923		Sedan			Coupe	1320							
Tour. Sed. Div.	3155	4845	Coupe, 2-4p	978		Coupe, 3p			Coupe Sed., 2d	1330							
Tour. Sedan, 7p	3210	4865	Tour. Sedan, 2d	983	3134	Brougham			Sedan, 4d	1360							
Bus. Tr. Imp., 8p	3260	4825	Tour. Sedan, 4d	1023	3179	Vict. Coupe			Conv. Coupe	1700							
Coupe, 2p	3280		Tour. Sedan, 7p			Tour. Brougham			Conv. Sedan	1790							
Tour. Sedan, 7p	3330		Limousine, 7p			Sedan	2897										
Coupe, 3-5p	3380	4695				Tour. Sedan			Custom								
Conv. Coupe, 2p	3380					Conv. Coupe			Coupe Sedan	1450							
Tour. Sedan, 5p	3635	4820				Conv. Brougham			Sedan, 4d	1400							
Conv. Sed., Trk.	3945	5030	DODGE						Limousine	1510							
Formal Sed., 5p	3995	4785	Country Club Six-93							1700							
Formal Sed., 7p	3995		Coupe, 3p														
Town Car, 7p	5115	5095	Country Club Six-93														
Series 90			Coupe, 3p														
Sedan, 5p	5140	5105	Country Club Six-93														
Tour. Sed. Div.	5215	5165	Coupe, 3p														
Tour. Sedan, 7p	5270	5185	Coupe, 3p														
Coupe, 2p	5340	4915	Coupe, 2-4p	830													
Imp. Tr. Sed., 7p	5420	5345	Coupe, 2d	835	3022												
Coupe, 5p	5440	5015	Sedan, 4d	933	3047												
Conv. Coupe	5440	4905	Sedan, 7p	1035													
Town Sedan, 5p	5695	5140	Limousine	1185													
Conv. Sed., Trk.	6000	5350															
Formal Sed., 5p	6055	5105															
Formal Sed., 7p	6055	5345															
Town Car, 7p	7175	5415															
CHEVROLET																	
Master 85																	
Bus. Coupe	628																
Coach	648																
Town Sedan	669																
Sedan	689																
Sport Sedan	710																



Wiring Diagram 1938 Buick, Series 40-60

(Continued from page 33)
side is toward the center of the pan. Is this right? And, would it be a good idea to leave this off? I would like your opinion of this trouble.

I forgot to mention I put in new oil but it didn't seem to help very much. Owner claims if he keeps an extra quart in motor, pressure is better or doesn't go back.

Now as to a 1937 Chevrolet Standard which has a bad growl when shifted into second, but when car is run (in second) a few seconds, it is perfectly quiet at any speed or under labor. Herman Godbey, Route 5, Salem, Missouri.

It is evident that the oil is flowing away from the oil pump which would seem to indicate that an insufficient quantity of oil is being carried in the case. This is borne out by the fact that the owner states if an extra quart is carried, the pump performs satisfactorily. It would seem to me that this is the best solution of this trouble.

It can be corrected, however, by installing baffle plates in the oil pan in such a manner as to completely surround the oil pump so that it will set in a well thereby preventing the oil from flowing away from the pump. When you install these baffle plates, however, be sure to leave space between the bottom of the plate and the oil pan so that the oil can flow into the well.

The 1937 Chevrolet which has a growl in second gear presents an interesting problem and might be caused

by several conditions. I assume that you have not disassembled this transmission and therefore do not know its condition. My guess is that the second speed synchronizer ring is badly worn so that when you attempt to shift into second gear and force the synchronizing ring on to the cone of the gear, it does not make a good contact and causes this noise. This seems to be substantiated by the fact that after the car is in second gear, the noise disappears. My suggestion is that you remove and disassemble this transmission and replace the second speed gear synchronizing ring and, at the same time, examine the synchronizing cone on the second speed gear to be sure that it is in good condition.

TAPPET CLEARANCE

I am having trouble with Ford V-8 tappet clearances. I think the chart I have for showing the position of the valves to be ground is wrong because on my last five or six jobs I have from one to three noisy tappets and the same ones on each job. Please give me a chart on this. I use a valve depth gage which I think is very good. Hickey's Motor Service, 2769 W. 6th St., Los Angeles, Cal.

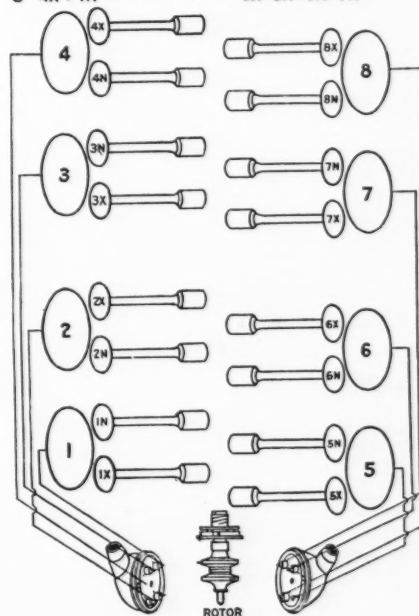
IN accordance with your request, I am printing below a reproduction of the Valve Grinding diagram covering the Ford V-8 engine. This information is taken from the Ford Service Bulletin and I am sure you will find it to be of assistance. The one point you must be careful about is to be

sure that the valves are fully opened.

DATA FOR GRINDING VALVES

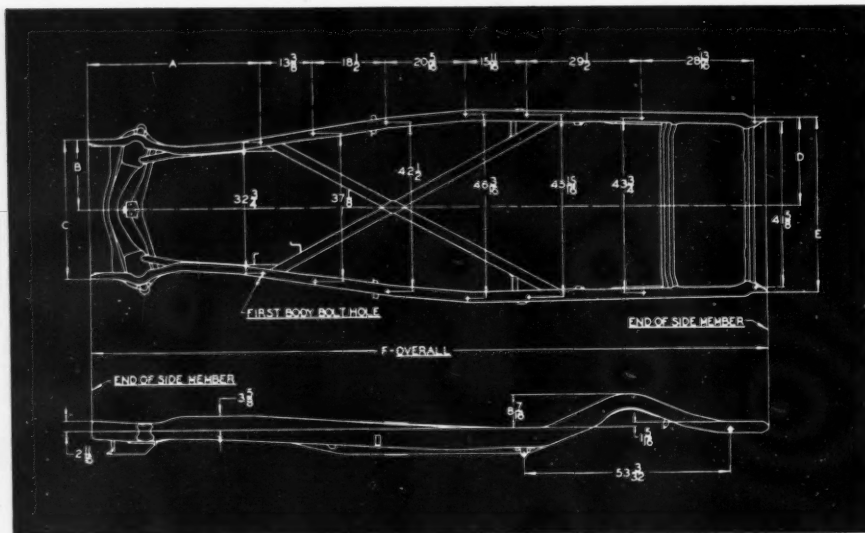
KEY: N-INTAKE X-EXHAUST

VALVES OPEN	VALVES TO GRIND
A 4X+1N	3X-8N-6N-7X-3N-2X
B 8X+5N	1X-7N-6N-7X-3N-2X
C 6X+4N	5X-2N-1X-7N-3N-2X
A 3X+8N	1X-7N-5X-2N-4X-1N
B 6N+7X	5X-2N-4X-1N-8X-5N
C 3N+2X	4X-1N-8X-5N-6X-4N
A 1X+7N	8X-5N-6X-4N
B 5X+2N	6X-4N-3X-8N
C 4X+1N	3X-8N-6N-7X



PISTON SLAP

I recently re-ringed a 1933 Master Chevrolet, installing new rings, pins (Continued on next page)



Pontiac 1938 Frame Dimensions

(Continued from preceding page) and gaskets. Also one rod. Had the other connecting rods aligned, ground rocker arms, tightened rod and bearings and regrooved ring grooves.

The result was no oil consumption but a clatter which is noticeable at idling speed and on a hill or grade as well as on pick-up. It is not noticeable when speed of 40 or better is reached. It is impossible to get any variance in the sound of said knock by shorting out a cylinder.

The walls had a taper of .010 in. First set of rings on original pistons with a speedometer reading of 50,000 miles. J. L. Kessler, Kessler's Garage, Colchester, Ill.

JUDGING from your description, I am inclined to the opinion that this is a plain case of piston slap—provided, of course, that you have removed the ridge at the top and bottom of the cylinder so that the new rings do not strike.

The new rings have increased the compression and have brought out the fact that the job has loose pistons which was not apparent with the old rings when the compression was not as high. It seems to me that the thing

for you to do is to install piston expanders or hone out the cylinders and install new pistons.

CLUTCH CHATTERS

I have a Chrysler Model C6 1935 on which the clutch was completely overhauled. The clutch chatters when warmed up after running approximately 10 miles or so. Have checked work thoroughly. Would appreciate some information on this situation.

Would also appreciate details and short cuts on knee action on Chevrolets and Pontiacs. Walter E. Arlen, Walter Arlen's Auto Repair, 8 Dodd Street, Bloomfield, N. J.

THE first thing I would do on your Chrysler Model C6 1935 clutch would be to make sure that the lining is free from grease and oil. If you are absolutely sure that it is, I would check for a bent clutch shaft or a clutch shaft on which the splines have been damaged, or otherwise worn. Another point is to make sure that the clutch plate is not binding on the pins. I assume, of course, that the clutch was assembled on a clutch jig.

Now with regard to the knee ac-

tion on Chevrolets and Pontiacs, I am sending you an article on this subject which should assist you in overhauling those jobs.

LEFT REAR GRABS

I am having trouble with three cars—all Willys 1931 models 97. When driving along on a smooth road with five people in the car, everything is fine, but when you hit a bump or a hole in the road, it causes the rear of the car to go down and the left rear brake grabs.

The cables have all been taken off, greased and lubricated and they are perfectly free. The only way I have been able to stop this trouble is by lengthening all four cables and then fitting the shoes as close as possible without having them drag on the drums. This is not satisfactory, however, because the brake pedal goes down to the floorboard and there is not enough brake action.

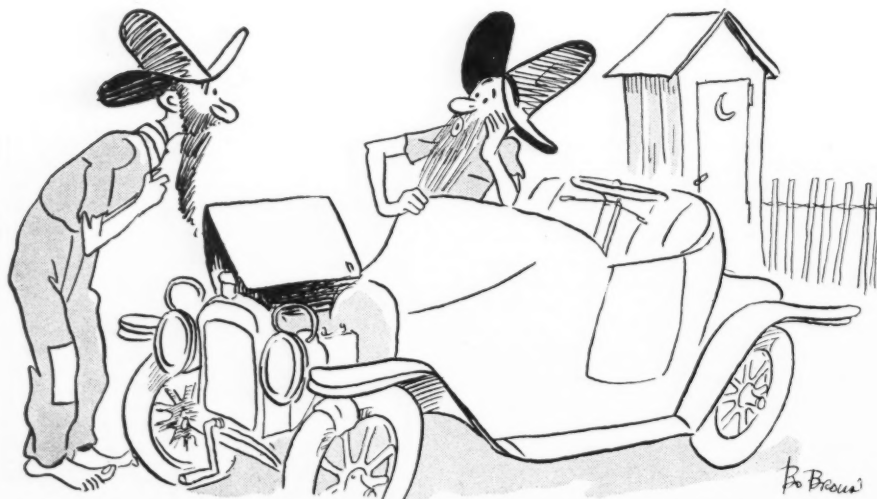
There is another condition that I have been unable to correct. When the car is backing up and the brake is applied, the left rear brake grabs and does not release. When the car goes forward, the brake shoes release with a snap.

I have tried relining the shoes, adjusting the cable linkage and have adjusted and equalized the brakes to the best of my ability. I have installed new brake return springs, tapered the ends of the lining, checked spring shackles—but all of this has not helped. The shoes look good and true and the drums are not scored.

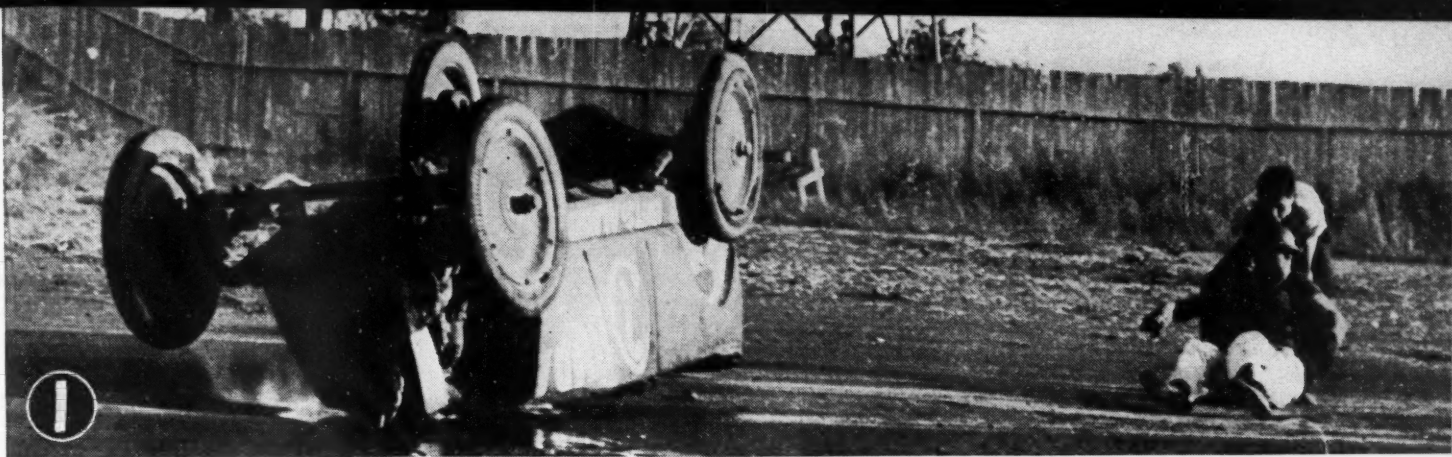
Why is it that only the left rear wheel causes trouble? I sure hope you can help me out with this problem. W. N. Dunn, Box 35, Cochran, Pa.

IN the first place, I would check the shock absorbers on the rear—particularly the left rear—to be sure it is operating properly. Then, I would install new conduits and cables on the rear brakes to be sure that they maintain proper curve from the brake backing plate up to the anchor point on the frame. It is quite apparent that this brake is being pulled on when the wheel drops away from the chassis. A new cable and conduit would, I believe, correct this trouble plus the fact that the shock absorber would retard the wheel action somewhat.

The trouble you encountered with the brake shoes sticking and failing to release when you backed up, indicates that the brake return spring is too weak or that the shoe is rubbing against the backing plate, that the brake operating cam is binding at the backing plate or that the brake cable is rubbing on the backing plate. There is also the possibility that the adjusting eccentric is burred so that it is not allowing free movement of the secondary shoes. Free up the brake operating cam and the eccentric and lubricate between the shoe and the backing plate and I believe this sticking trouble will be eliminated.



"If we could read 'n' write, we'uns could write to th' Clearin' House!"

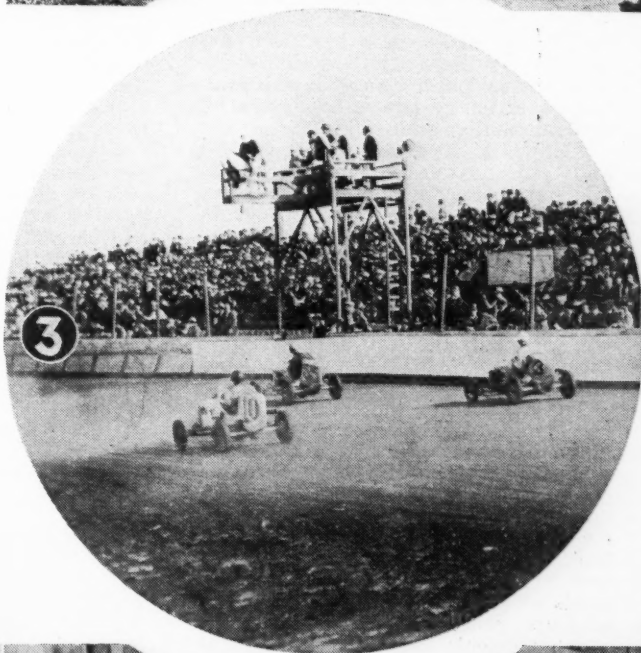


1. Death Rides Jallopies, too. Bud Minyard, 25, being dragged away from the wreck of his overturned 14-year-old car after it had blown a tire on the 97th lap of the 100 lap jallopY derby held recently at the Ascot Speedway, Los Angeles. Minyard died of his injuries shortly after this picture was taken.

2. Velocity and View. Evidently lead-footed foreign drivers like to enjoy the scenery during speed contests. Here's Hermann Lang, well known European speed star, as he tooled his car over the picturesque Grossglockner pass in Austria during a road race.



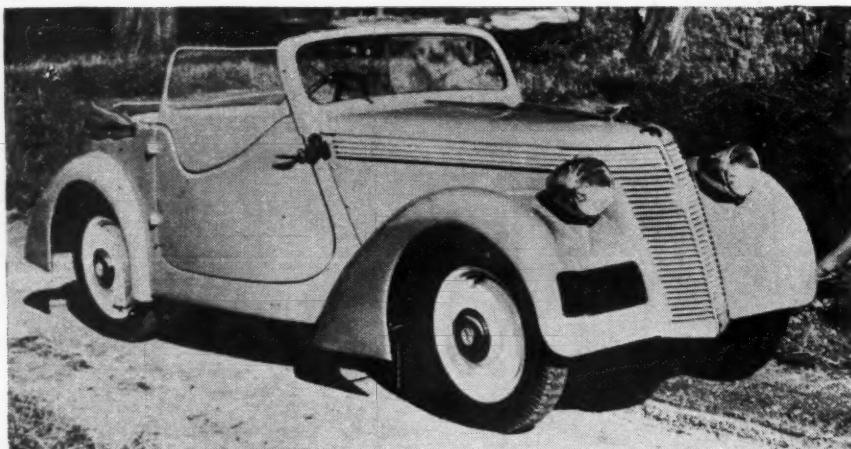
3. Matching Midgets. Three mighty mites roaring past the spectators as Ronnie Householder, of Oakland, Cal., won the recent National Midget Auto Championship at Detroit. Not a single accident marred the race.



4. Melodious Mechanics. H. T. Adams of Surrey, England, built an organ in his garage as a spare time occupation. Every part, except the metal pipes, was made by Adams who built it all, with the exception of the console, without plans. After recitals in the garage, the organ will be installed in a church.

5. Sub-stantial. Barney Connett, garage mechanic, shown as he arrived in Chicago after crossing Lake Michigan in his home-made, one-man submarine. Built like an overgrown lake trout it is 11 ft. long, two ft. wide. Powered by five regular Kathanode automobile batteries it cruises at four m.p.h., with a top speed of nine m.p.h.





Hamilton Wright Organization, Inc.

New Model, although not one you'll be likely to see pulling into your shop this year. It is the Jawa, Czechoslovakian light car which is produced by F. Janacek who is known as the Henry Ford of that country. It has an 81 in. wheelbase (130 in. overall length), is powered with a two-cylinder engine that develops 19.5 h.p. and is said to deliver 38-40 miles per gallon of gasoline. It is one of the few European cars equipped with front wheel drive. It is priced to sell for under \$600.

Course in Engine Tune-Up Offered

Ethyl Corp. Establishes Post-Graduate Study Program To Supplement Practical and Theoretical Knowledge

Establishment of a post-graduate course in the engineering principles of automobile tune-up for mechanics, motor service men, and students of technical and trade schools throughout the United States has been announced by the Ethyl Gasoline Corp. as an extension of its nationwide clinical education system affecting the oil and automotive industries.

Planned to supplement the practical and theoretical knowledge of automobile maintenance men and engineering students, the advanced study program will be carried out in Ethyl motor clinics, which will function in more than 200 cities.

Forty-four automobile engineers and specially trained tune-up experts will constitute the staff of instruction, according to John G. Martin, national director of the Ethyl motor clinics.

The syllabus of the course and the method of teaching were devised by automotive engineers who surveyed the results obtained in Ethyl motor clinics operating from coast to coast during the last year. Discussions, demonstrations and class-room exhibits will be employed to teach the new art of motor tune-up to thousands of students. Every step of the tune-up procedure, a development which parallels that of modern automobiles and high octane fuel, will be scientifically explained and then demonstrated on a car operating under its own power on the clinic's chassis dynamometer, a device which duplicates actual road conditions while the car runs at various speeds.

The course of study will begin with a discussion of the engineering principles involved in the operation of modern motor cars. This will be followed by a series of laboratory demonstrations employing scientific equipment perfected in recent years for diagnosing engine troubles. The importance of an exhaust gas analysis and the use of an exhaust gas analyzer to determine the leanness or

richness of a fuel mixture will be the first procedure to be clarified.

Emphasis will be placed on the function of the distributor and instruction will be given on distributor settings for proper timing. Students will be taught that, in order to follow factory specifications, they must continually compensate for wear on the moving parts of the distributor.

Application of a coil tester and condenser tester for detection of weaknesses will be explained, and its actual use demonstrated to the classes. Methods of making valve tappet adjustments will be described. The principle that valve lifting cams are designed for certain tappet clearances and that these must be maintained to insure correct valve timing and life will be stressed. Why the high combustion temperatures of modern high output engines require good valve seating at all times, particularly at high speeds, to insure satisfactory valve cooling is another study topic.

Complete instructions on how to

check the carburetor which controls the automobile motor's fuel diet will be presented. Modern carburetors must accommodate a wide speed range and give good distribution at all speeds to all cylinders.

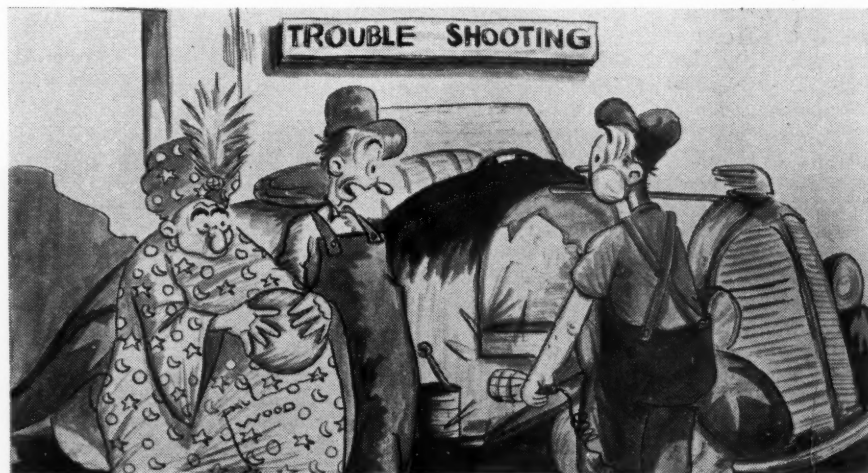
The use of the dynamometer will be featured during the discussions and demonstrations, since this instrument is one of the most outstanding devices thus far developed to enable a mechanic to test an automobile under actual road conditions without taking the car from his shop.

Anti-Freeze Facts

Interesting developments in the use of anti-freeze in automobile cooling systems have resulted from seven years of research by E. I. du Pont de Nemours & Company. This research was conducted for the purpose of determining the type of anti-freeze material best suited for the needs of the modern automobile cooling system. It also revealed important facts in relation to the use of a chemical solution to assure radiator protection in winter and in summer.

The high spots of this research revealed: That a methanol anti-freeze, although low-boiling, does not soon evaporate from the radiator leaving only the water behind and removing the necessary protection, as many persons believed.—That mechanical losses of liquid from the radiator, as contrasted with evaporation losses, have proved to be much more important than has hitherto been supposed.—That losses of liquid are neither straight anti-freeze nor straight water, but anti-freeze and water in very nearly the same proportion in which they were originally present in the radiator.—That losses of liquid should be replaced with a solution of the same concentration as was originally present in the cooling system.—That a rust and corrosion inhibitor could be incorporated with the anti-freeze without in any way impairing its high cooling efficiency.—That an anti-freeze containing a rust and corrosion inhibitor could be used in summer as well as in winter so as to maintain at all seasons a free circulation in the cooling system.

During this period of research practical road tests totalling 400 "car years" and more than 1,000,000 miles



"I got him as a last resort!"

of operation were regularly checked for results and subjected to careful investigation. In these investigations the properties of methanol as an anti-freeze and its improvement of the heat transfer properties of water were noted.

A study was then made of materials for combating rust and corrosion. After testing numerous rust inhibitors on representative water supplies from all over the country, a combination inhibitor was chosen which could be incorporated with methanol without affecting the anti-freeze properties. The combination of methanol and rust inhibitor was given an extensive practical road test during the summer of 1936 in 15 selected areas throughout the country.

As a result of these tests the methanol anti-freeze "Zerone" produced by du Pont, which a few years ago was used only in cold weather, is now used in summer to prevent rust and corrosion in the cooling system.

Jenkins May Wait Until '39 for Mile Dash

Eyston's 357.5 m.p.h. Record May Remain Uncontested Unless Weather Change Favors "Mormon Meteor"

Super-speed's statisticians are prepared to lock up the record books for 1938 with the world land mark still the 357.5 miles per hour established at Bonneville Saltbed on September 16 by Captain George Eyston, the Englishman.

For, they say, Ab Jenkins, America's No. 1 speed record holder, has indicated that he will wait until 1939 before riding the most hazardous mile ever known.

The weatherman is accused of putting a "crimp" in Jenkins' schedule and the word was that Jenkins next year will make an earlier appearance on the salt flats, 120 miles northwest of Salt Lake City, Utah, his home town.

While Jenkins exhibited his newest "Mormon Meteor" to the home folks during the Utah State Fair at Salt Lake City in early October, the driver scanned the skies in hope for perfect weather to provide a smooth course for an assault on the records list up to forty-eight hours of continuous driving.

But by mid-October Jenkins had all but made official announcement that his proposed run was "off" for the season. After inspecting the wet surface of the salt flats on October 12, the American record ace indicated that it would be impossible for the course to dry out at this season of the year. With instructions that he would send word if conditions improved, Jenkins sent Augie Duesenberg, veteran speedster builder, and his mechanic back to Indianapolis.

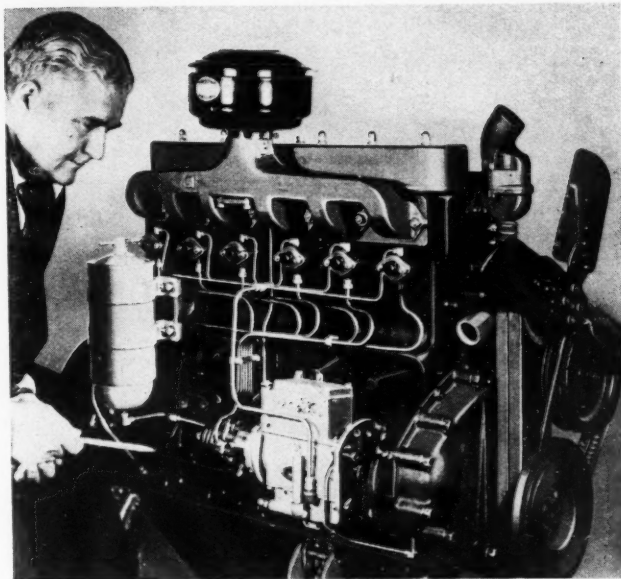
The new car, one of the most conventional ever to seek world speed records, was constructed in the Duesenberg plant at Indianapolis. Jenkins had planned to return there immediately after his distance records assault and add a second engine to the mount for a try at Eyston's peak gait for the mile.

Jenkins' newest mount is a giant sized duplicate of a sports car. Hinting at the cockpit design of the English super-speed mounts of Eyston and

Dodge Diesel

Dodge Truck division of Chrysler Corp. is entering the 1939 oil burning engine field with a Dodge Diesel three-ton truck. J. D. Burke, the company's truck sales chief, is shown here with the four-cycle, 331 cu. in. displacement, six cylinder engine. It has a 3 3/4 in. bore, 5 in. stroke. The crankshaft has seven main bearings.

The new engine will be displayed at the Automobile Show and Truck Show in New York this month.



Cobb, Jenkins' mount carries a bonnet over the driver seat with the front and side windshields fastened to the top. The driver's head is completely enclosed. Past experience at Bonneville has taught Jenkins to avoid the stinging rain of the loose salt scooped from the surface by the spinning wheels. The car weighs some 5,000 pounds.

Although Jenkins had not completely given up hope of running this year, as MOTOR AGE went to press, the prediction at Salt Lake City was that the American would have to wait for the 1939 "carnival of speed" before putting in the first American bid for the straightaway record since 1929.

Drain-All Rack

Designed to salvage oil from empty oil cans, the Drain-All Rack has been announced by the Drain-All Company of Atlantic City, N. J. Draining 20 supposedly empty cans in the rack will yield a quart of good oil. The rack is scientifically designed to completely drain oil from either the small quart can, or the large 5-qt. can. It is constructed of heavy sheet iron, finished in a copper bronze color. It is claimed that the rack will last a lifetime. Retail price, \$1.75; west of Rockies, \$1.95.



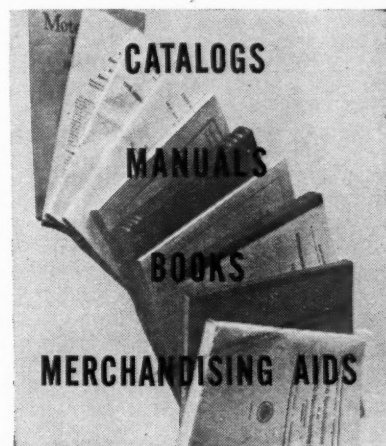
N.A.P.A. Conferences

With a two-day meeting in Atlanta, Ga., Oct. 14 and 15, the National Automobile Parts Association brought to a close its 1938 series of regional jobber conferences, which began Sept. 13 in Minneapolis, and included two day meetings, as well, in Portland, San Francisco, Los Angeles, Dallas, Kansas City, Chicago, Columbus, Buffalo and New York.

The conferences were attended by

a total of more than 2000 jobber executives and key-men, which according to Mr. Henry Lansdale, general manager of NAPA, represented an increase of more than 15 per cent in attendance over the 1937 conferences.

The total sales volume of the National Automotive Parts Association, which reached an all-time high in 1937, will reach a new peak in 1938 according to announcement made by Mr. Lansdale during the course of the conferences. Running counter to the curve of the industry as a whole, NAPA sales volume for the first eight months of 1938 surpassed the same period of 1937.



Raybestos' new "Warning" poster in full color is being displayed by dealers as an opening wedge for brake adjustment and relining business.

A single volume, just off the press, containing complete service information for mechanics on all 1937-38 models of Ford V-8, Chevrolet and Plymouth cars has just been announced by the National Automotive Parts Association through its headquarters at 705 Fox Building, Detroit. The manual may be obtained through NAPA Warehouses and jobbers.

The new 105-page manual is the fifth in the series of comprehensive NAPA Mechanics' Repair Manuals, but is the first to combine under one cover all data on the three cars which

(Continued on page 42)



Wreck and Wrecker. Jim Park, who runs a shop in Norton, Va., was so proud of his new wrecker he had to send us a picture of it in operation. Jim says the sorry looking mess behind the wrecker is a car which rolled 200 ft. down the side of a mountain, carrying nine passengers, none much injured.

AAA Indicates '39 May See Wider Race Supervision

Automobile racing and certified motor tests will undergo a wider scope of official supervision in 1939, it was decided at the annual meeting of the American Automobile Association's Contest Board in New York City on Oct. 17 and 18.

Ted Allen, secretary of the governing body, said the board "adopted a broad program of development and expansion." He said details of the program would not be available until several committees report.

The board again endorsed the International Formula of rules accepted in 1938 and scheduled for revision for the 1941 season, Allen reported.

The sixteen-member board is headed by Captain "Eddie" Rickenbacker, World War flying ace and former race driver. The board meets once a year, usually in New York. National headquarters are in Washington, D. C., home of the parent organization, the American Automobile Association.

Flexible Fuel Line

A new flexible fuel line which is said to offer superior flexibility and heat resistance as well as universal adaptability to the wide variety of oil filter installations has been announced by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. The new



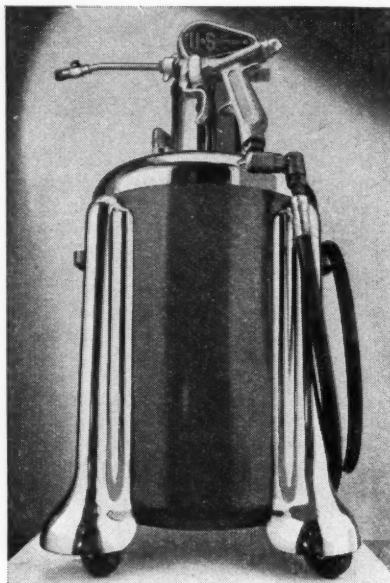
line, known as Imperial Universal Oil Filter line, is available in graduated lengths from 12 in. to 36 in. with $\frac{1}{4}$ in. S.A.E. swivel nut on one end and $\frac{1}{2}$ in. male pipe thread on the other. Hose is $\frac{3}{16}$ in. i.d., or equivalent to $\frac{1}{4}$ in. o.d. tubing.

U. S. Announces

New Lubricating Unit

A new lubricating unit known as Model JB 25 Silver Scout Lubricator has been announced by K. S. Clapp, general manager of The United States

Air Compressor Co., 5320 Harvard Ave., Cleveland, Ohio. The unit holds the original 25-pound container or 65 pounds of lubricant in the bulk. Handles all types of fluid chassis lubes and



comes equipped with 8 ft. of high pressure chassis hose. A new feature is the trigger-type gun giving a controlled flow of lubricants.

Clyde E. Weaver

Service Station Equipment Co., Muskegon, Michigan, manufacturers of "Bennett Pumps" announce the return of Clyde E. Weaver, better known to his friends as "Red," in the capacity of vice-president and sales manager.

Mr. Weaver merely "changed horses" since he is well known in the equipment field through his previous connection with Globe Hoist Company of Philadelphia where he served in a sales executive capacity.

He has compiled an impressive record of service in the equipment field totalling nineteen years, starting after a turn in the United States Navy during the War.

Tebben Appointed by Mallory

P. R. Mallory & Co., Indianapolis, Ind., has announced the appointment of John D. Tebben as sales manager of the metalurgical division with headquarters at Indianapolis. Mr. Tebben was formerly district sales manager of the Detroit area.

Riess Reorganization

New executive set-up for the Riess Mfg. Co., following its reorganization affecting personnel and distribution, is as follows: C. B. Roeller, president; Dr. R. S. Heffner,

treasurer; W. A. Mowrer, secretary; R. B. Plummer, vice-president and general manager; W. H. Mead, assistant secretary-treasurer.

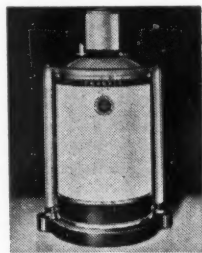
"Material improvements have been made in the design of Riess equipment and a new distributing set-up will make our precision machines available to servicemen everywhere," said Mr. Plummer.

Appointments have been completed to handle factory representation in sales in Penna., Md., Del., and D. C. These areas will be in charge of C. B. Roeller and Dr. R. S. Heffner, Pottstown, Penna.

S. H. Peterson has been appointed factory representative for the New York Metropolitan area and the New England states. He will be located at 420 Lexington Ave., N. Y.

Aro Has New Heavy Duty Lubricator

A large-capacity, heavy-duty, high-pressure lubricator which will deliver direct from the original 400-lb. drum has been announced by The Aro Equipment Corp., Bryan, Ohio.



Maximum convenience in changing drums is provided by a two-post air operated lift by which the complete pumping unit with cabinet is instantly raised by merely plugging in to the air line. The unit is designed to handle any lubricant ordinarily used for passenger car, truck or bus lubrication, and is ideally adapted for use in any lubrication department where large volume of lubrication service is performed and where rate of grease delivery is important.

Cylinder Head Puller

The latest product of Rinck-McIlwaine, Inc., 16 Hudson St., New York City, is their No. 63 cylinder head puller and lifter set. Heavy foot clamps which span at least three cylinder head studs, are placed on top of the engine. The jack screw is then threaded into the spark plug hole. Pressure nuts are then screwed down until tension breaks the head loose. The stand set takes all Fords since 1932 (both 60 and 85), all Plymouth, Dodge, Chrysler, Nash, Willys and all others using either 14 or 18 mm. spark plugs, according to the manufacturer. Bushings are available for $\frac{7}{8}$ -in. spark plug openings for other cars and trucks. The set is priced at \$5.50.



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Toledo Super-Forged
Guaranteed Valves
are built for a long life of
satisfactory service. They are
especially engineered to with-
stand the punishment of to-
day's high speed, high com-
pression motors and slow-
burning fuels. Always insist
upon genuine Toledo *Guar-*
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Look for the Name

TOLEDO

Books, Catalogs, Merchandising Aids

(Continued from page 39)

probably constitute the largest percentage of repair work for most garages.

Sections pertaining to each car are treated as independent units, each being divided into nine major chapters dealing with (1) Engine, (2) Ignition and electrical Systems, (3) Carburetor and Fuel Pumps, (4) Clutch, (5) Transmission, (6) Universal Joints and Propeller Shafts, (7) Rear Axle, (8) Front Axle and Steering

Gear, and (9) Brakes. Over 130 illustrations explain the text.

A Special Service Information section and ruled pages for the owner's own index of service items are included.

Although slightly higher in cost (\$1.25 per copy), the Ford-Chevrolet-Plymouth manual for 1937-38 is really three manuals in one, covering six different cars.

Including for the first time a table on the effect of load and speed on tire service, with percentages of recommended maximum loads at maximum sustained speeds to obtain normal tire service, The B. F. Goodrich Company, Akron, Ohio, has just published an

Operators Handbook on truck, bus and farm and industrial tractor tires. Copies can be obtained upon request to the company.

Containing 66 pages, the volume includes statistical material of interest to operators of commercial vehicles, on highways, farm and factory. Description and specifications of the company's products for these varied services are included.

Four pages are given to a discussion of how to prevent truck tire failures, including the heat-speed problem. Two pages are devoted to methods of correctly calculating truck tire costs, with a description of the company's new and improved truck tire calculator. This calculator can also be obtained upon request.

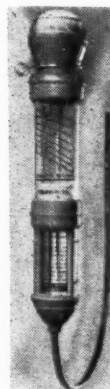
Load analysis, load and service diagrams, load ratios and inflation pressures, and specifications for truck and bus tires, rims and dual spacings comprise six pages.

A new Automotive Service Lathe Bulletin, No. 33-J, has just been released by the South Bend Lathe Works, 425 E. Madison St., South Bend, Ind., and will be sent free upon request. It illustrates and describes the important automotive machining operations.

Nor'way Offers

Sales Helps

Commercial Solvents Corp., 230 Park Ave., New York City, makers of Nor'way Anti-Freeze, has developed a number of sales helps as part of their campaign for the sale of anti-freeze during the coming season. Outstanding among these is a cooling system service manual and an anti-freeze calculator. The calculator is made on the slide rule principle—one side indicates the quantity of Nor'way anti-freeze needed for a specified protection, and the other side indicates how much to add to a system already protected with Nor'way, when additional protection is desired for lower temperatures. A new direct-reading hydrometer has been developed for use with Nor'way anti-freeze, and provides an instant check on the condition of the cooling system solution.



Overland

(Continued from page 26)

model U-1B, 1½ in. carburetor and an AC fuel pump from an eight-gallon tank at the rear.

All windows are of safety glass and the design of the windshield is such that full road vision, close to the front of the car is obtained. Interior fittings are distinguished by quality in appearance and materials. A distinctive type of instrument panel with the speedometer and the engine indicating devices centered in an attractive panel easily read from the driver's seat.

The seats are wide. The front seats offer a full 50 in. of seating capacity and a front seat adjusting feature is included.



FIRST AND FIFTH AT INDIANAPOLIS

FIRST AT ALLENTOWN

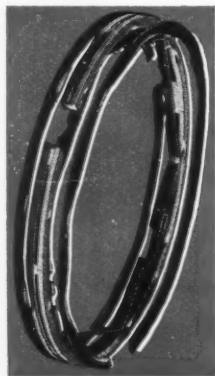
FIRST AT PIKES PEAK

FIRST AT SYRACUSE

SECOND AT ALTOONA

FIRST AND 4TH AT MILWAUKEE

BURD MADE HISTORY IN 1938!



Three rings in one! Three times as many scraping edges, twice as much capillary cushion, plus flexibility 3 ways.

You bet Burd made history, both in racing and in research! From the fastest time ever turned in for the grueling grind at Indianapolis to the speediest spurts at Pikes Peak and Syracuse, racers who relied on Burd piston rings rolled consistently into racing money. . . . But the big event of 1938 was won in the research laboratory when Burd engineers developed the "Super Hi-Speed" oil ring. It is hanging up new world's records for keeping oil down in worse-worn cylinders. Best of all, the winnings are yours! If you haven't yet qualified, make your entry now. Write today for full particulars on the Burd Certified Service franchise.

Burd Piston Ring Co., Rockford, Ill.
(Associate Co., Liberty Foundries Co.)

Read the Records

May 30—INDIANAPOLIS.
1st, Floyd Roberts; 5th, Chet Gardner. In addition to establishing a new track record of 117.2 m. p. h. in the race, Roberts earned the pole position with 125.68 m. p. h.

Aug. 20—SPRINGFIELD, ILL.
Fastest qualifying time, Duke Nalon.

Aug. 21—MILWAUKEE, Wis.
2nd, Chet Gardner; 5th, Jimmy Snyder.

Aug. 25—MILWAUKEE, Wis.
2nd, Chet Gardner; 4th, Jimmy Snyder.

Aug. 28—MILWAUKEE, Wis.
1st, Chet Gardner; 4th, Floyd Roberts.

Sept. 5—ALTOONA, Pa.
2nd, Jimmy Snyder.

Sept. 5—PIKES PEAK Hill Climb
1st, Louis Unser.

Sept. 10—SYRACUSE, N. Y.
1st, Jimmy Snyder.

Sept. 24—ALLENTOWN, Pa.
1st, Duke Nalon.

Sept. 25—READING, Pa.
2nd, Duke Nalon. Nalon also had the fastest qualifying time.

Oct. 1—RICHMOND, Va.
1st, Duke Nalon. (new record)
2nd, Ted Horn. Fastest qualifying time, Ted Horn (World's Record).

Oct. 2—TRENTON, N. J.
1st, Duke Nalon; 3rd, Ted Horn. Fastest qualifying time, Ted Horn.

BURD

Super Hi-Speed

PISTON RINGS

LINDBLOOM VALVE PACKING • HADEES HOT WATER CAR HEATERS

ATLANTA, GA. . . 542-544 Spring St. N.W. LOS ANGELES, CAL. . . 1425 S. Flower St. ST. LOUIS, MO. . . 3225 Locust Blvd.
BOSTON, MASS. . . 1 Brighton Ave. MINNEAPOLIS, MINN. . . 21 S. 13th St. SAN FRANCISCO, CAL. . . 540 McAllister St.
CHICAGO, ILL. . . 2236 S. Wabash Ave. NEW YORK, N. Y. . . 540 W. 52nd St. SEATTLE, WASH. . . 1809 Boylston Ave.
DALLAS, TEXAS . . . 2705 Canton St. TORONTO, S. Ont. Can. . . 20 Hayter St.
KANSAS CITY, MO. . . 1006 McGee St. GET PROMPT SERVICE FROM ANY OF THESE CONVENIENT BURD WAREHOUSES WINNIPEG, MAN. CAN. . 126 Lombard

YOU don't need a lot of money to equip your shop with "Twenty-five" Series LINCOLN LUBRICATING EQUIPMENT



Model 981-C

LINCOLN AIRLINE LUBRIGUN, Model 981-C, will dispense all types of Chassis lubricant directly from the original 25-lb. container. The air-operated full automatic pump is securely attached to the lid of a sturdy metal shell of proper diameter to fit over a standard 25-lb. container.



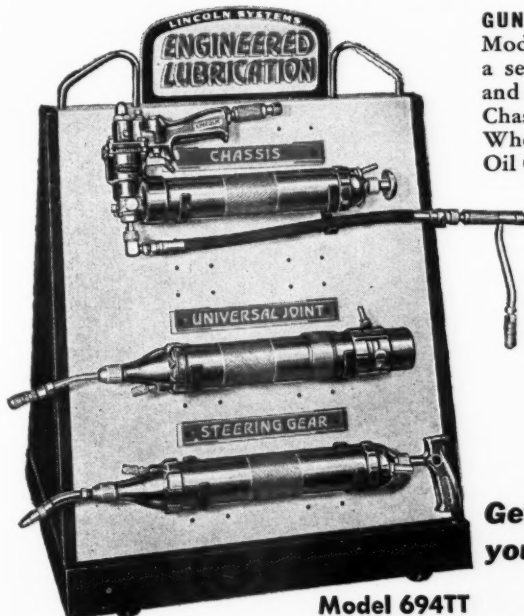
Model 586

SPRING REPACKER, Model 586, solves the problem of pumping lubricants of heavy graphite content such as are frequently recommended for metal encased springs. Includes five foot hose and spring clamp for attachment to spring casing.



Model 591

HAND-OPERATED GEAR LUBRICANT DISPENSER, Model 591, is a companion unit in appearance and size to the Chassis and Universal Joint Lubriguns, but operation is by hand instead of by air. Convenient handle permits easy operation of pump with one hand while discharge nozzle is held in position with the other.

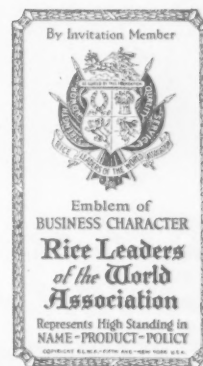


Model 694TT

GUN CARRIAGE complete with Lincoln Lubriguns, Model 694TT (front of which is illustrated at left) is a seven-gun assembly including powerized chassis and universal guns. Assembly includes Gun Carriage, Chassis Gun, Universal Gun, Steering Gear Gun, Wheel Bearing Gun, Water Pump Gun, Suction Pump, Oil Gun and Air Coupler.

If the "Twenty-Five" Series is not large enough for your requirements—Lincoln also makes larger units dispensing lubricants direct from original 100 lb. and 400 lb. containers. You will find a large selection of modern equipment illustrated and described in Catalog No. 51 . . . The complete Lincoln line affords you a choice of units in individual cabinets, in two and three unit "Streamliners" and in combinations which make up the new Lincoln Floor Batteries and the new Wall Batteries.

Get details on complete line through your nearest **LINCOLN** jobber . . . or **WRITE US.**



"It's better to buy **LINCOLN**—than to wish you had"

LINCOLN ENGINEERING COMPANY
PIONEER BUILDERS OF LUBRICATING EQUIPMENT
GENERAL OFFICES, ST. LOUIS, MO. FACTORIES: ST. LOUIS, MO., DETROIT, MICH.

NOW! BRAND NEW OLDSMOBILE

OPENING UP A WHOLE NEW
MASS MARKET
TO ALL OLDSMOBILE DEALERS!

\$777 ★ AND UP

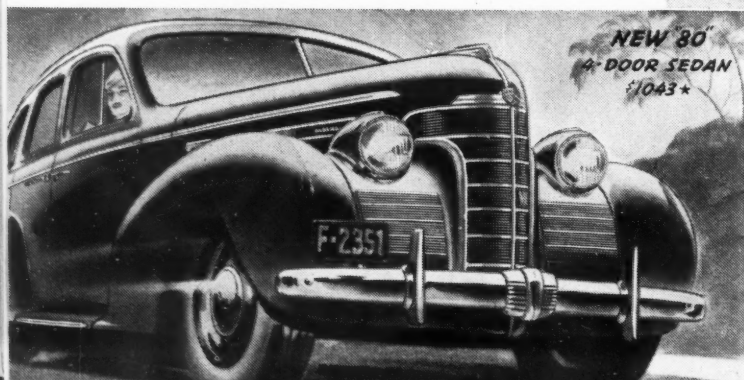
NEW '60"
4-DOOR SEDAN
\$889★



**ALSO FOR 1939
ANOTHER BIG NEW
OLDS SIX AND GREAT
NEW EIGHT TO SELL
AT REDUCED PRICES**



NEW '70
4-DOOR SEDAN
1952★



NEW '80
4-DOOR SEDAN
\$1043★

OLDS DEALERS are set to GO in 1939! Think of it... a stunning new Olds "Seventy" and "Eighty" for the regular Oldsmobile Six and Eight market... plus a sensational, new Olds "Sixty" for the big-volume, low-price field. If you want to GO with Oldsmobile in 1939, get in touch with D. E. Ralston, c/o Oldsmobile, at Lansing, for complete information.

★ Delivered price at Lansing, Mich., subject to change without notice. Price includes safety glass, bumpers, bumper guards, spare tire and tube. Transportation, state and local taxes, if any, optional equipment and accessories—extra. General Motors Instalment Plan.

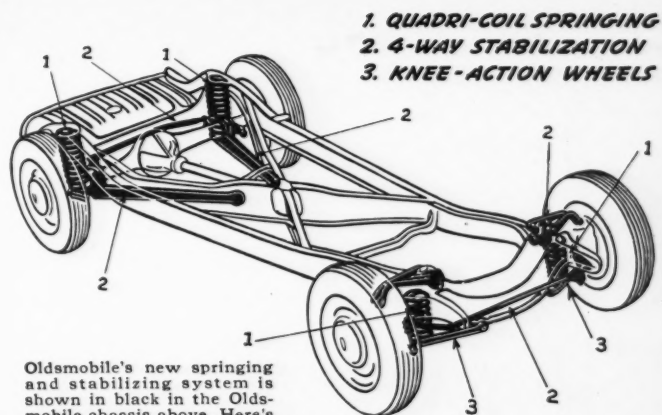
MOBILE

**IN NEW
LOWER PRICE
FIELD!**



OLDS SCOOPS THE INDUSTRY WITH THE NEW RHYTHMIC RIDE !

It's a *genuine* "scoop"—this revolutionary Rhythmic Ride. There's nothing just like it in any other car. Quadri-Coil Springing, which includes Knee-Action, combines with 4-Way Stabilization to produce the smoothest, gentlest ride of them all. Big, coil springs, one at each corner of the car, cushion the body against road shocks. Up-and-down movement is controlled by double-action hydraulic shock absorbers. Fore-and-aft motion, side-to-side motion, and body roll are governed by dual stabilizing arms and lateral stabilizer bars, front and rear. Olds' Rhythmic Ride is a "natural" if there ever was one . . . and it's an exclusive Olds selling feature!



Oldsmobile's new springing and stabilizing system is shown in black in the Oldsmobile chassis above. Here's the real secret of the Rhythmic Ride, offered only in Olds!

THIS YEAR IT'S OLDSMOBILE!

THE RED HOT LINE FOR '39

Chevrolet

(Continued from page 16)

effect with consequent improvement in engagement characteristics, increased facing life, and increased torque efficiency.

While the major features of the 216.5 cu. in. engine remain unchanged, many improvements are incorporated. Valve mechanism has been improved both in design and manufacture, producing quieter valve action. Tappets now are of solid type with a fine surface on the cam ends. Lower ends of push rods have spherical surfaces.

A new double-row ball bearing water pump has been adopted, per-

manently lubricated and sealed for life, requiring no service adjustments.

Simplified mounting of the distributor is an important improvement. A single bolt serves the dual purpose of a fastening as well as means of adjusting for changes in timing.

The harmonic balancer is new, the flexing member consisting of a pair of annular soft rubber rings embodying six raised bosses on one face of each ring. When the rings are placed over the six studs riveted to the hub, the rubber bosses form an insulating bushing about each stud.

Increased fuel economy is promised by enlargement of carburetor balance vent hole from $\frac{1}{8}$ to $\frac{3}{16}$ in. The exhaust manifold valve thermostat has been revised again to provide

more heat for improved carburetion and fuel economy.

Chevrolet knee-action is of the same general type as is found on the higher priced General Motors cars. Vital improvement both in production and in service comes from the fact that the complete suspension system is designed as an independent unit which may be assembled or disassembled as a unit. For service, this makes it possible to remove the entire unit, consisting of the knee action suspension, stabilizer bar, wheels and tires, without special tools either for removal or for checking caster and camber. Use of synthetic rubber seals at the bearings in the suspension simplifies lubrication and increases life.

Adjustment of caster angle, which is zero, is made by means of the pivot bolt which is threaded within the knuckle support. Since the pivot bolt is eccentric, turning it also adjusts the camber.

Steering knuckle in the front suspension is new and of the reversed Elliot type. The kingpin is similar to last year's, fitted with the same bearings, bushings, and thrust ball bearing, except that the location of the latter is between the lower yoke and knuckle support.

Due to the introduction of soft springs both front and rear, on the Master deluxe, Chevrolet has adopted hydraulic double-acting, end-to-end discharge shock absorbers both front and rear.

A new steering linkage has been developed to improve steering geometry and facilitate better handling. Steering effort is transmitted from the pitman arm to a two-piece tie rod. Modified ball-and-socket joints connect the tie rods to the steering knuckles and pitman arm.

Outstanding feature is the optional vacuum power gear shift mechanism, employing a single vacuum cylinder of the air-suspended type. An obvious advantage of the device is that gear changes can be made manually with the engine dead. Although there is sufficient power to handle the full load of gear shifting, the mechanism has been designed purposely so as to provide enough reaction on the shift lever to preserve a degree of "feel" to the operator.

Basically, the chassis for the Master 85 is the same as for the Master deluxe, the principal differences being the same as in 1938.

The Master 85 has conventional front suspension, comprising an I-beam axle, semi-elliptic springs, airplane-type shock absorbers, and ride stabilizer. Rear axle ratio is 3.727 to 1, which results in greater fuel economy but less acceleration. It also has a larger engine fan for adequate engine cooling with this lower engine speed, and a different size radiator core. Rear shock absorbers are single-acting. Steering linkage is conventional.

The riding qualities of the Master 85 for 1939 are greatly improved by an entirely new design of the front suspension. The double-action shock absorbers at the front subdue the shocks of rough roads, and front springs with more rubber give a softer reaction to bumps. The ride stabilizer prevents excessive movement of one spring relative to the other.



3 excellent K-D FOG LAMPS, Models No. 855, 857 and 850, stand ready for duty . . . each one a leader in its class. You need all three!

Special lenses, beautiful bodies, rugged brackets, quality built and thrift-priced for quick sale.



CATALOG NO. 38 READY-WRITE!



MODEL No. 855
K-D FOG LAMP
De-luxe design
7 in. lens;
chrome or black
enamel.

Members by Invitation—Rice Leaders of the World Association

THE K-D LAMP CO.
CINCINNATI, OHIO

Ford Anti-Freeze

WAS BORN WITH A HEAD START IN THE MARKET

Ford Anti-Freeze was placed on the market under the Ford label. That gave it a head start as a sure-fire sales item the first day it was out. It's one of a large group of products appealing directly to every Ford owner. One out of every four cars is a Ford—which gives Ford Anti-Freeze a mighty big market. But that is only part of the Ford Anti-Freeze market!

Ford Anti-Freeze is widely advertised and is going over big with owners of every make of car because IT COSTS NO MORE THAN ORDI-

NARY HIGH-GRADE ALCOHOL yet it has these added salable features:

1. It protects against freezing at 5° lower than the same quantity of ordinary alcohol.
2. It contains a corrosion inhibitor effective for all metals in the cooling system.
3. It lasts longer because of slower evaporation.
4. It contains no grain or denatured alcohol and therefore is free from unpleasant alcohol odor.
5. It is backed by the Ford Motor Company's reputation for dependability.

Three handy-sized containers enable you to give quick, clean service—quart can, gallon can, five-gallon can. A 54-gallon drum is designed for large-volume orders.

Tie up with Ford Anti-Freeze now for this winter's profits. Call the authorized distributor for Genuine Ford Parts in your territory and get full information on liberal dealer discounts and factory sales helps.

FORD MOTOR COMPANY
DEARBORN MICHIGAN



*Retails at no more than
ordinary high-grade alcohol—*

ONLY 25c QUART
\$1 GALLON

Nash

(Continued from page 24)

The Nash bed arrangement, a popular feature for the last two years, will be continued in 1939. Improvements have been made so that the bed can be set up in a few minutes in the rear of the car, and that a much more comfortable sleeping arrangement is obtained.

The new body design gave Nash engineers an opportunity to widen bodies as much as four inches, especially improving the comfort of the front seat. Both the front and rear seats offer ample room for three.

Windshield vision has been greatly increased through increases in width and height, and by the pitch of the glass.

The Nash Cruising Gear, the equivalent of an automatic fourth speed forward, will be a standard equipment feature on the Ambassador Eights, and will be available as an option on all models.

Beneath the floor is a new and sturdier frame. It is described as double frame construction. The side channels in the rear have been widened, and a new Z member has been added in the rear just in front of the gas tank.

Because of the importance of the "Weather Eye," development to better

motoring, Nash will make this one of their major advertising and selling features during the cold months, Brees announced.

The "Weather Eye" breathes in as much as 800 cubic feet of fresh, filtered, outside air a minute and maintains a very slight air pressure in the interior. As a result, the flow of air always is outward from the car interior.

Newest and most sensational mechanism of the "Weather Eye" system is the "Weather Eye" itself, a development of engineers of the Nash and Kelvinator division of the corporation. A simple dial is used to control the system, and with it motorists can "tune in" the kind of winter car comfort they desire.

The "Weather Eye" automatically maintains all winter long the kind of car comfort chosen by continually balancing samples of outside air with samples of interior air. Changes are flashed immediately to the "Weather Eye" thermostat which automatically controls the flow of water through the heating core.

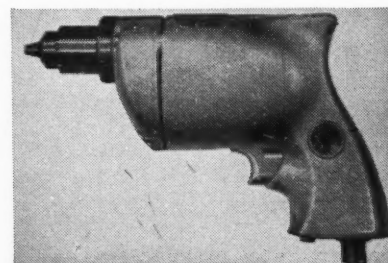
The system obtains its fresh air supply through the cowl ventilator. An intake housing is built in all Nash cars just below the ventilator. This housing, containing a rainshed which prevents moisture from coming into the car, is standard equipment on all models. The remainder of the "Weather Eye" system is an extra option on all but the Nash Ambassador Eight cars. It is the standard equipment on the Eights.

An air filter fits into the housing behind the rainshed. The rest of the system is installed under the cowl, just below the ventilator. It has been designed so that it does not detract from the increased foot room in the front of the new Nash cars.

Although windows do not ordinarily fog up and frost with this system, a unique defrosting arrangement is provided for severe mid-winter driving. A flick of the control lever directs the full heat of the conditioning system against the windshield to prevent ice from forming. The heat is carried up to vents built into the moulding at the inside base of the windshield.

Black & Decker Announces New Drill—Holgun

A new ¼ in. drill weighing only 2¼ lbs. and known as the Holgun is the latest product of Black & Decker Mfg. Co., Towson, Md. Designed with pistol grip and trigger switch, the new unit operates on either AC or DC current. Its light weight and small size make it an extremely handy tool.



Black & Decker standard of workmanship and material are adhered to in the production of this new unit.

THIS NEW LUBRICANT WON'T HURT THE CHASSIS RUBBER WHEN YOU STOP THOSE SQUEAKS!

Penetrating lubricant, made by Du Pont, says "SH-H-H" to squeaky parts

AT LAST there's a rubber lubricant that won't harm rubber! It's "Orel," the most effective, longest-lasting squeak eliminator you've ever seen! Made by Du Pont, this remarkable new chassis lubricant penetrates where ordinary "penetrating oils" can't go. Use "Orel" on all rubber parts and metal-to-metal chassis contacts. Make it part of your regular lubrication routine. "Orel" is made by Du Pont, the makers of "Zerone" Anti-Rust Anti-Freeze. Order your supply today from your "Zerone" jobber when you'll be ordering "Zerone," too. Cases of three gallons, \$1.85 per gallon. Five-gallon containers, \$1.75 per gallon. E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

LIFE



ALUTE TO BEAUTY

COVERS THE AUTOMOTIVE MARKET

LIFE'S NOV. 14 ISSUE BRINGS THE SHOW TO TWO MILLION ABLE-TO-BUY HOMES

Rapidly returning confidence, matched by enormous, undeniable backlog of waiting-to-buy customers, provide a rosy hue to motordom's 1939 prospects. Industry leaders predict that sales will top 1938 by 25 to 30 per cent, that when the products of long, hard planning on drafting

boards are unveiled publicly, the incentive to buy will be tremendous. New models show more changes, both in styling and mechanical refinements, than ever before; prices are as low, if not lower than 1938. The industry is ready, the public wants to buy. The new and old cars

bought by LIFE families are driven an average of 14,000 miles yearly. LIFE, a grand show to 18,000,000 readers every week, will further project its new kind of *pictorial journalism* in its November 14 Automobile Show Issue. Two million *plus* families will "see" the Show in LIFE.



RCA

TWO-WAY POLICE RADIO THWARTS GRIM REAPER

Dodging a drunken, zig-zag driver, two Lancaster, Pa. cruising coppers crashed into a tree. One was paralyzed, the other knocked out. Regaining his senses, the lesser injured picked up the receiver, found the RCA two-way

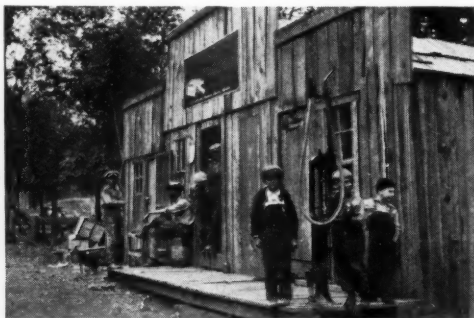
radio undamaged, promptly called headquarters for an ambulance. RCA features its services and products, including auto radios, in "Listen", its own multiple-page monthly magazine within LIFE.



TIDE WATER

HE DIDN'T EVEN STOP!

Tide Water Associated Oil Company's Veedol Motor Oil LIFE ads poignantly stress needless accidents, need for car's safety-checking.



COMMERCIAL CREDIT

UGLY DUCKLING CAN BECOME SWAN

Even this humble "filling station" in the Ozark Hills could become a super-deluxe drive-in. Magic used would be Commercial Credit Company's (LIFE advertiser) "One Contract" purchase plan.



STUDEBAKER

PREVIEW OF A SENSATION

Not a new Hollywood star making her triumphant bow at a film premiere, but Studebaker's preview—equally glamorous and thrilling—at South Bend when able Paul G. Hoffman, president, adopted typical Hollywood opening night technique, allowed all and sundry a preview of the new models.

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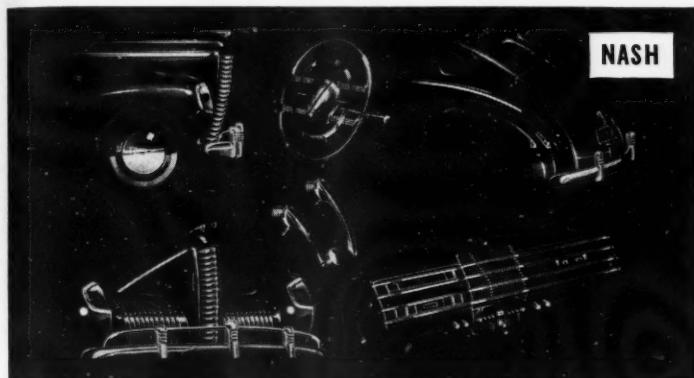
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INTERNATIONAL

LUXURIOUS JUNGLE YACHTS INVADE DARKEST AFRICA

Deluxe trailer-homes, used by Commander and Mrs. Attilio Gatti's Belgian Congo expedition, are International Trucks—a LIFE advertiser.



NASH

DRAWING BOARD DETAIL

Nash's speed and style, and new air-conditioning device, the "Weather Eye", latest Nash riding sensation, are advertised in LIFE's pages



SEIBERLING

TESTING "SAW-TOOTH" TREAD

Branch managers watch new traction principle demonstrated during skid tests of Seiberling's new LIFE-advertised "saw-tooth" tread Safety Tire.

THREE BEAUTIES

Charlet Hiteman, who was "Miss Kentucky" at the Atlantic City Beauty Pageant, and Monajoy Gentry, of Evanston, Illinois, take time out to

drink a milk toast to General's Balloon 6-20, made by The General Tire and Rubber Company, long-time LIFE advertiser.



GENERAL TIRE

WHAT'S HAPPENING IN THE AUTOMOTIVE

We have told you about LIFE as a nationwide advertising medium. These two pages tell you about LIFE in one town . . . in Poughkeepsie, New York. LIFE threw the statistical spotlight on a representative American town, went probing with camera in hand, commissioned one of its investigating photographers to visit Poughkeepsie. These two pages are the result,

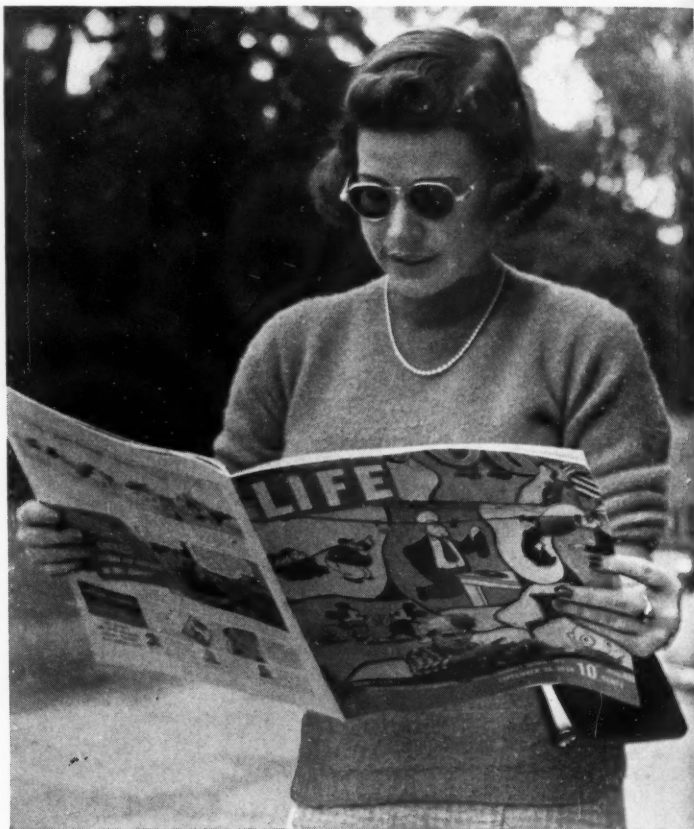
and answer the question, "What's Happening in the Automotive Market in Poughkeepsie?" LIFE found in Poughkeepsie a self-contained town with about 45,000 population and a wide range of industries . . . a town nationally famous for its Vassar, its regatta, its Smith Brothers Cough Drops, its famed near-kin, Franklin Roosevelt . . . a town proud of its 250 years'

history and unblushingly using the sub-title, "Queen City of the Hudson". Poughkeepsie, whose strange name is derived from a complicated Indian phrase meaning "Reed-Covered Lodge by the Little Water Place", is a popular convention city, was the capital of New York State during the first four years of the Federal Constitution.



THIS IS POUGHKEEPSIE

Officer Herman Solaway directs traffic on Poughkeepsie's busy Market Street at a point on the Post Road where 52,000 cars have been clocked within 24 hours. More than 1,200 copies of LIFE are bought in Poughkeepsie. This means that LIFE—with 10 readers per copy—is read by 12,000 people, or 27% of the population.



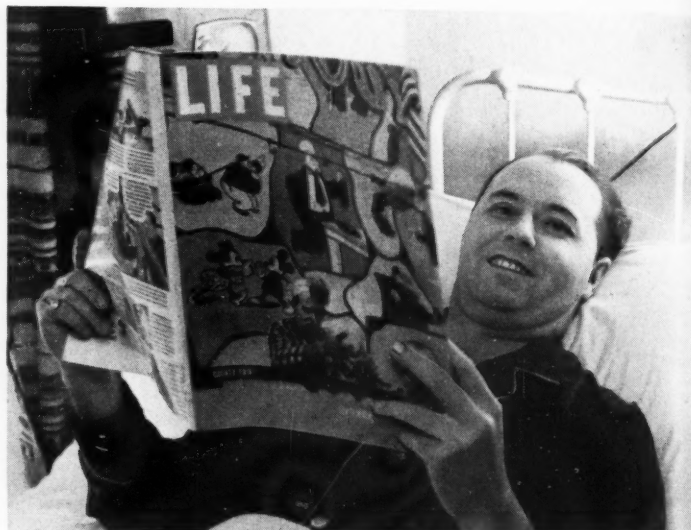
VASSAR IS IN POUGHKEEPSIE

Sally Fogg, Vassar College junior, pauses between newsstand and campus to look at LIFE, believes that in it students find an ideal way to keep pace with the world during a crowded year. Her sweater is Vassar-style, buttoned up the back, topped with the traditional pearl necklace.



POUGHKEEPSIE'S MAYOR

Popular, able George V. L. Spratt, mayor, is a Democrat serving his third term in a Republican stronghold. Volunteers Mayor Spratt: "LIFE copies were so scarce at the beginning that I was glad I was pretty well known! They'd save my copy at the newsstand, and hide it until I came for it. LIFE is a grand magazine."



BED-RIDDEN BUSINESS MAN

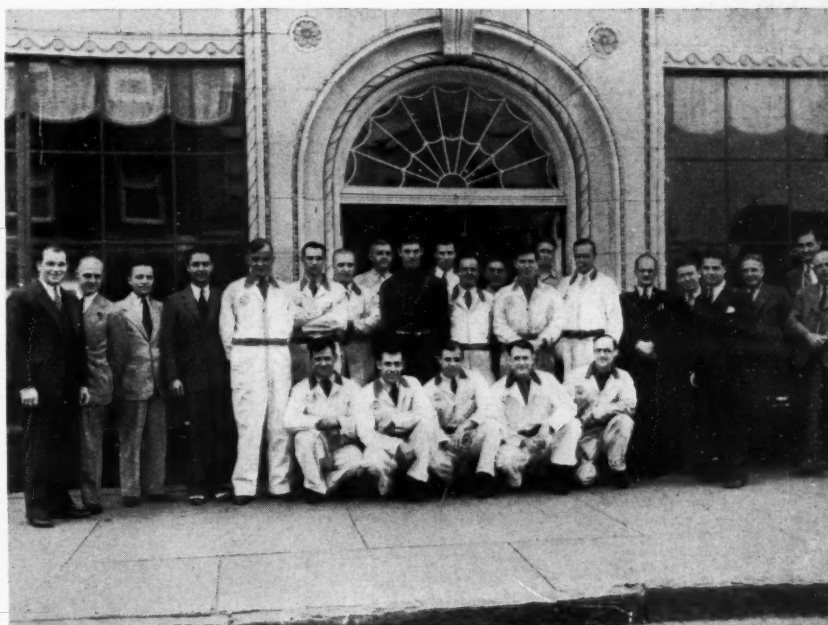
Arthritis-ridden Donald V. Spoor runs a lively subscription business from his bed, handles 100 LIFE subscribers by 'phone. Faced with six more years of confinement before he'll really be well, plucky Spoor says of LIFE: "It's always been good, but the last six months have made it bigger and better than ever. It takes me a good full day to read LIFE now."

MARKET IN POUGHKEEPSIE?



POUGHKEEPSIE'S CHEVROLET DEALER

In three years, Dick Richard's Mid-Hudson Chevrolet agency has sold 1,365 Chevrolets, definitely giving the agency a place in the sun which it has held ever since. Story of car buyers' confidence is found in this fact: ratio of used to new cars sold is about 2½ to 1. Customers average 20,000 miles yearly, turn in their Chevrolets about every two years.



CHEVROLET STAFF

LIFE's photographer personally interviewed 16 of Mid-Hudson's salesmen and shop mechanics, found that of the 16, eight buy LIFE every week on the newsstand, 4 are LIFE subscribers, and one lets his family buy it as long as they let him read it! Says Dealer Richard: "We all agree that the Chevrolet advertising copy is of consistently high calibre, but in LIFE this high-grade performance is given additional punch by interesting and intelligent editorial matter, as well as the good paper and swell print job."



DEALER'S DAUGHTER

Small, pretty Aline Richard takes after her father and mother by reading LIFE each week as soon as she can get her hands on it. She was born in Japan, where the Richards spent three years in the automobile business in the late twenties.



MONEY-MAKER

Irving Greidman's newsstand at the corner of Main and Hamilton Streets is but one of thousands over the country which let the LIFE Force work for them. Every month, Irving's customers buy more copies of LIFE than any other magazine, spend almost as much for LIFE as for any other two weekly magazines combined.

82% OF CHEVROLET BUYERS READ LIFE

LIFE secured a list of Poughkeepsie families who bought Chevrolets during the past several months. To answer the questions: "How does LIFE cover the Automotive Market?", "How does LIFE cover recent Chevrolet customers?", a random cross-section of customers (44 Chevrolet-purchasing families) were selected, were interviewed in person or by phone, with the following results:

Never miss LIFE	24	55%
Read LIFE pretty regularly	12	27%
	36	82%
Do not read LIFE	8	18%
	44	100%

These 44 families estimate an average annual mileage of 22,500. Noteworthy is LIFE's 82% coverage of this field, the clear 55% of the families that are unflinching, week-after-week readers.

If this is happening in Poughkeepsie, Mr. Dealer, what's happening in your town? In Alliance, Evanston, Oklahoma City? In Nashville, Des Moines, Richmond? Or wherever you're located? If you take a statistical look

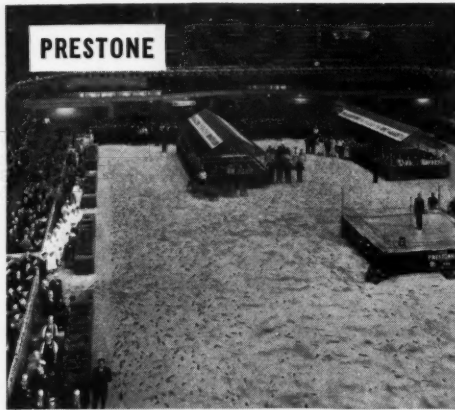
around, you'll discover some startling facts of LIFE! You'll find it more thoroughly, more consistently read by all members of the family—important, car-buying units—than any other magazine in the history of publishing.



CADILLAC

CLOCK WATCHER

Edward M. Gable, factory inspector, sees that each clock keeps accurate time before it is installed in LIFE-advertised Cadillac cars.



PRESTONE

WINDY CITY BLOWOUT

5,000 dealers and service men attended the prepare-for-winter party which LIFE advertiser "Eveready Prestone" held in Chicago.



SHELL

WHEN IT'S STOP-AND-GO

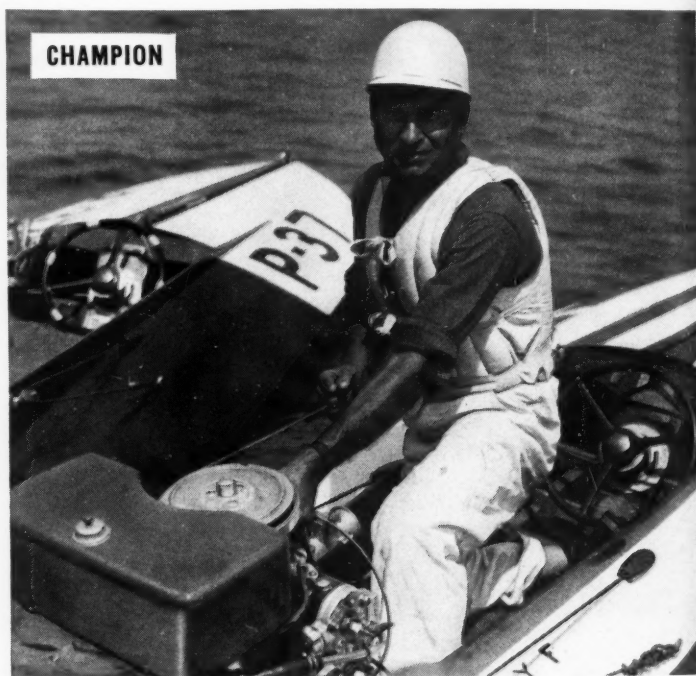
And the answer to Stop-and-Go driving is Super-Shell, dramatically advertised to LIFE readers by the Shell Oil Companies.



KELLY-SPRINGFIELD

KELLY GIRL NEVER GROWS OLD

Well over two decades have passed since Lotta Miles, the attractive Kelly girl, first smiled out of a frame formed by a Kelly-Springfield Tire. Above, the current Kelly girl is still smiling. Makers of Kelly-Springfield Tires tell the story of high mileage in LIFE pages.



CHAMPION

OUTBOARD CHAMPION

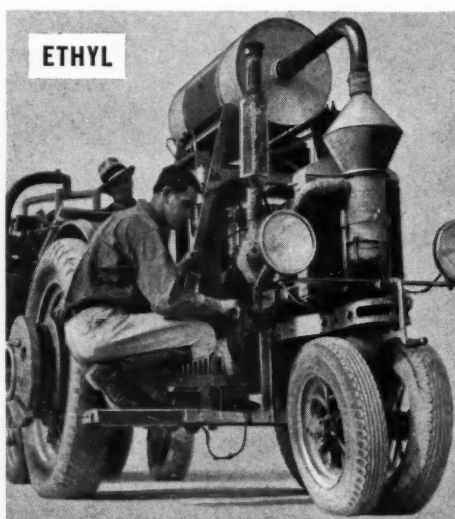
Busy banker Douglass C. Fonda, was undisputed amateur outboard champion for 1937, piling up 36,000 points in his 20,000 miles of travel to compete in 84 races. According to Fonda, Champion LIFE-advertised plugs stand up under terrific punishment.



DE SOTO

HEAP BIG BARGAIN

Ralph W. Dixey, full-blooded Shoshone Indian, completes the deal on his LIFE-advertised De Soto with Clarence Cox, De Soto dealer.



ETHYL

IRON HORSE RESEARCH

Ethyl Gasoline Corporation, LIFE advertiser, adds test instruments to typical farm tractor in never-ending, extensive field research work.



GOODRICH

LIFE-SAVER PRINTS

Tread of LIFE-advertised Silvertown tire is fingerprinted by Los Angeles police as A. D. Gardner (center), B. F. Goodrich Company, watches.



FORTY-FIVE THOUSAND TEXACO DEALERS ALSO HAPPY

Properly and appropriately identified are Jimmy Wallington, Una Merkel and Kenny Baker of "The Texaco Star Theatre", heard over nationwide CBS stations on Wednesday nights. Texaco, long-time user of LIFE pages,

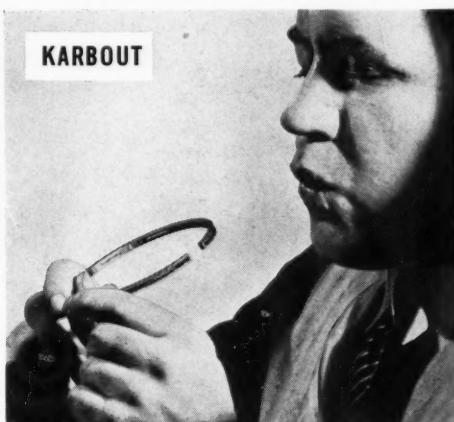
discovered Kenny Baker originally in 1935. Una Merkel, Kentucky-born, is well known over the air and in films. Jimmy Wallington has been a Texaco radio salesman for over two years.



CROSLY RADIO

UNATTACHED ROAMIO

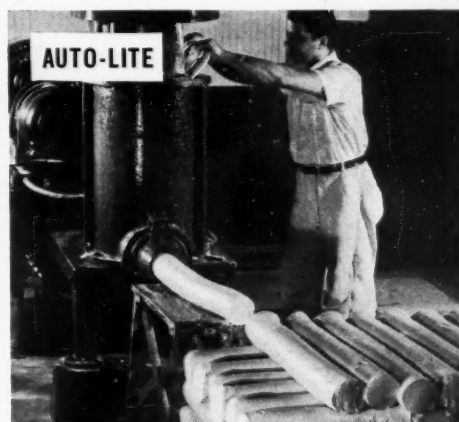
Easily installed, completely contained unit is LIFE-advertiser Crosley Corporation's new Safety-Tune push button Fiver Roamio.



KARBOUT

KARBOUT CLEAN-OUT

Shaler Company advertises in LIFE that Karbout forces dirt off piston rings by the same principle this man employs when he blows it off.



AUTO-LITE

ZIRAMIC — NOT BOLOGNA

Newly developed Ziramic material forms insulator bodies of LIFE-advertised spark plugs, made by The Electric Auto-Lite Company.



PLYMOUTH

TOUGH ON CAR AND FOXES

Chrysler Corporation's LIFE-advertised Plymouth sedan is used by Frank Holub (right) and sons, of Tabor, Minnesota, to catch 25 foxes. Latest sport entails chasing Reynard through plowed fields and broken country.



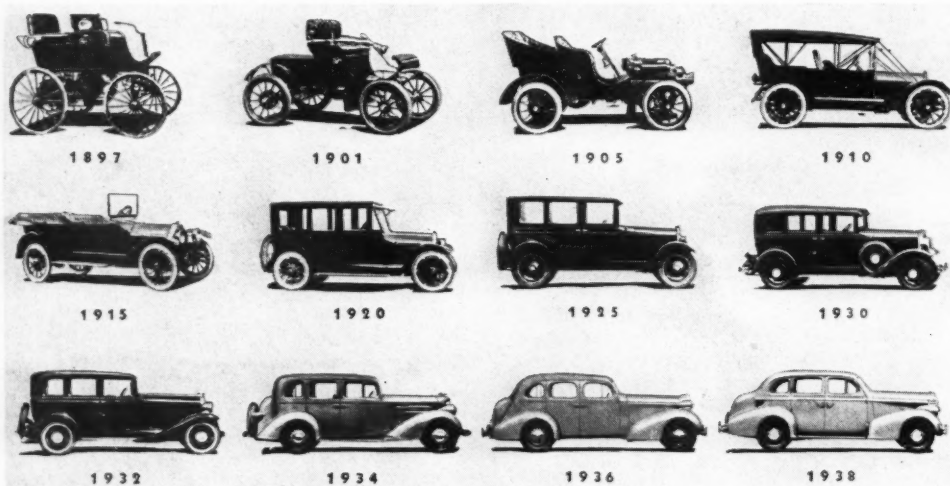
QUAKER STATE

CHANGE-OVER BANNER

Quaker State Oil Refining Corporation uses year 'round LIFE advertising, point-of-sale display material—such as this thought-provoking banner—to sell customers on proper grade winter lubricants.



LIFE'S 2,100,000 families own 2,097,900 automobiles. Vitally important to the motor industry, these 2,100,000 LIFE families pay \$800,000 a month to read LIFE—almost as much for copies of LIFE every month as for any other two weekly magazines combined.



FOUR DECADES

Oldsmobile, once a pioneer, today a member of General Motors family and LIFE advertiser, looms large as a factor in America's important industry. It's difficult for Young America—1939 Model—to imagine this “nation on wheels” ever getting excited enough about a car to sing a song about it. Yet our grandfathers harmonized over “me and Lucille, in my merry Oldsmobile”. The Oldsmobile of 1897 steered with a horizontal bar, used high-priced, high-pressure bicycle tires, attained the reckless speed of 15 miles an hour.

THESE MADE HORSES MAD—MADE WOMEN FAINT

Socony-Vacuum Oil Company, makers of Mobilgas and Mobiloil and regular LIFE advertiser, was one of the first gas and oil companies to supply pioneer motorists. This photo of the first National Auto Show,



held in 1900 at the old Madison Square Garden, New York, gives some idea of the various designs given the “horseless carriage” by pioneering motor makers of that time.



Graham

(Continued from page 21)

vided by removing the rear seat.

Such outstanding appearance features as the forward-leaning radiator, headlamps flush with the leading edge of the fenders, door handles in line with the chrome belt molding, and concealed door hinges, introduced by Graham last year, are retained. Running boards, however, have been replaced by a chrome molding running along the lower edge of the body between fenders. To those who prefer them, full-width running boards are available at extra cost.

Among the optional extras offered is a column-mounted shift lever which has the same gear positions as the conventional shift lever, but in a vertical instead of in a horizontal plane.

Specifications show that the 90-hp. L-head engine has a cast-iron cylinder head of new design. Engines with supercharger are fitted with aluminum cylinder heads. Other equipment items going with the supercharger include dual exhaust manifolds, special exhaust valves, a 1½-in. instead of a 1¼-in. carburetor, a dual muffler system, a larger radiator core, a kick-shackle in the steering system, a larger battery, and larger tires.

The Special is available in any one of five different colors, viz., black, clipper gray, Meadowbrook green, Monte Carlo bronze, and Riviera blue. Custom models may be had in Egyptian ivory, cloud gray, mapleleaf green, and regal maroon.

Ford, Mercury

(Continued from page 20)

where the X-channels meet the side rails, the flanges fit into those of the side members to form full box sections which continue to both ends of the frame. The result is a frame of unusual rigidity.

Another point of difference between the Ford 85 and the Mercury is the torque tube and drive shaft which is similar in design to that used on the Lincoln-Zephyr. Rear axle ratio is 3.54 to 1 which should result in reduced engine wear and better fuel mileage than are normally expected from a 239 cu. in. engine. The transmission of the Mercury is of the blocker type and while differing in detail resembles that used on the Zephyr.

Braking system on all three Ford cars is similar and is of the normally energized, independently anchored, two shoe type with double piston pressure cylinders. Brake drums on the Ford and Mercury are 12 in. in diameter. For smooth braking and equalized shoe wear, front wheel cylinders on the Ford and Mercury are 1¼ in. at the front and 1 in. diameter at the rear. Rear wheel brake cylinders are 1¼ in. at the front and 1 in. toward the rear. As a result, braking distribution is 55 per cent front and 45 per cent rear.

Only a single rubber tube is used on the Ford and Mercury to connect the master cylinder to the rear wheel cylinders. This is accomplished by carrying the tubing down both rear radius rods to the rear wheels. At the front end of the torque tube it is directly connected to the master cylinder

through the single rubber tube. Front tubing layout is conventional.

Cable controlled parking brakes actuate the same shoes at the rear as are used for service braking. The hand brake handle is located under the left side of the instrument panel, thereby giving more room for front seat passengers.

Riding comfort is improved through the adoption of new soft seat construction. In addition, there is more effective body insulation and sound treatment based on data collected in elaborate road and laboratory tests, making the cars exceptionally quiet even at high road speeds over rough road surfaces.

Chrysler

(Continued from page 17)

ing obstruction from the front compartment, the brake lever was moved to the left side of the driver under the dash.

Constant speed electric windshield wipers are now fitted, and the area swept over by the wiper blades has been increased.

A new synthetic enamel finish is used on all Chrysler cars, which is claimed to be harder and more durable, and to hold its color and luster longer than that used in previous years.

Quick Turn-over Quick Profits » » »

STOCK EVERY FASTENING NEEDED IN

The
LAMSON
Treasure
Chest



Fits a standard 24" stock shelf section

Contains 118 kinds and sizes of parts

Cabinet finished in green, matching shelving

15 drawers, plainly labeled, inventory of contents for you

Has the sizes you need for repairs every day

Priced at \$9.95 to \$29.50—cabinet included, of course

You don't have to miss sales because you can't find the right size, or kind, of bolt, nut, cotter, cap screw or washer—any longer. There are 118 sizes and types of fastenings in the LAMSON Treasure Chest—the furniture steel stock cabinet with its 15 labeled drawers containing your complete stock of every kind of fastening you need for regular repairs. No looking around in dark corners or bins, no dumping out tin cans for a part you need. Here they are—in arm's reach—at the end of your counter or your stock shelf. Keeps all sizes sorted for you, keeps them clean, keeps them ready for use. Best of all is the famous LAMSON 1035 Double Heat Treated Cap Screw—made especially for your use—with the extra length thread which increases the usability of your stock. All parts contained in the LAMSON Treasure Chest are made to original manufacturers' specification—genuine original parts—every one of them. Ask your Jobber's salesman about this "new deal"—or ask us.

THE LAMSON & SESSIONS CO.

GENERAL OFFICES, CLEVELAND, OHIO

Manufacturers of the LAMSON "25" LINE

This advertisement appears in MOTOR AGE—Nov. 1938; and in MOTOR WORLD WHOLESALE—Nov. 1938

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Divd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE																	CHASSIS						
					No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to-1.)	Displacement Factor %	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Type and Make	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension		
1	Bantam	60 497½	75¼	5.00/15	4-2.2x3.0	7.75	45.6	20-4000	5.22	23.0	CI	Own	Als	No	No	Til	Buf	AL	USL	P.Ro	WG	m-UP	½ Spi	5.25	Tr			
2	Buick	39-40 996	120	6.50/16	8-3½x4½	30.6	248.0	107-3400	6.10	39.4	CI	LB	Al	No	AC	Car	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	4.44	IC			
3	Buick	39-60 1246	126	7.00/15	8-3½x4½	37.8	320.2	141-3600	6.25	41.9	CI	LB	Al	No	AC	Str	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	3.90	IC			
4	Buick	39-80 1543	133	7.00/16	8-3½x4½	37.8	320.2	141-3600	6.25	39.2	CI	LB	Al	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.18	IC			
5	Buick	39-90 2074	140	7.50/16	8-3½x4½	37.8	320.2	141-3600	6.25	38.0	CI	LB	Al	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.55	IC			
6	Cadillac V8-39-61-60S	1680	126-127	7.00/16	8-3½x4½	39.2	346.0	135-3400	6.25	39.2	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC			
7	Cadillac V8-38-75	2995	141	7.50/16	8-3½x4½	39.2	346.0	140-3400	6.70	39.7	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	Nb-Mec	½ Own	4.58	IC			
8	Cadillac V-16-38-90	5140	141	7.50/16	16-3½x3½	67.6	431.0	185-3600	6.75	43.8	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	4.31	IC			
9	Chevrolet Master 85	689	112¼	6.00/16	6-3½x3½	29.4	216.5	85-3200	6.25	38.0	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	3.72	C			
10	Chevrolet Mas. DeL.	720	112¼	6.00/16	6-3½x3½	29.4	216.5	85-3200	6.25	38.0	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	4.22	IC			
11	Chrysler Roy. C-22	1010	119	6.25/16	6-3½x4½	27.3	241.5	100-3600	6.50	38.1	CI°	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC			
12	Chrysler Imp. C-23	1198	125	7.00/16	8-3½x4½	33.8	323.5	130-3400	6.80	42.3	CI°	Mor	Whit	Pur	AC	Str	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	3.91	IC			
13	Chrysler Cus.Im.C-24																											
14	De Soto	S-6 970	119	6.00/16	6-3½x4½	27.3	228.1	93-3600	6.50	37.4	CI°	Mor	Ala	Pur	AC	Car		AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC			
15	Dodge	Six 855	117	6.00/16	6-3½x4½	25.3	217.8	87-3600	6.50	37.8	CI	Mor	Als	Pur	AC	Str		AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	C			
16	Ford	V8-60 112	112	5.50/16	8-2.6x3.2	21.6	136.0	60-3500	6.60		Al	Dia	CS	No	Yes	Str	Own	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr			
17	Ford	V8-85 112	112	6.00/16	8-3½x3½	30.0	221.0	85-3800	6.15		CI	Dia	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.78	Tr			
18	Graham Spec.&Cus.96		120	6.00/16	6-3½x4½	25.3	217.8	90-3600	6.50		CI	LB	Als	No	Bur	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C			
19	Graham Sc.&Cus.Sc97		120	6.25/16	6-3½x4½	25.3	217.8	116-4000	6.70		Al	LB	Als	Fram	Bur	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C			
20	Hudson 112	90-98 755	112	6.00/16	6-3x4½	21.6	175.0	86-4000	6.50	32.4	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
21	Hudson-Six	92 864	118	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	36.3	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
22	Hudson-C.C.Six . .	93 915	122	6.25/16	6-3x5	21.6	212.0	101-4000	6.25	35.4	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
23	Hudson-C.C.8. 95-97	1060	122, 129	6.50/16	8-3x4½	28.8	254.5	122-4200	6.25	39.2	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
24	Hupmobile. 6 R-915		115	6.00/16	6-3½x4½	29.4	245.3	101-3600	5.75	40.9	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.27	C			
25	Hupmobile Six. 922E		122	6.25/16	6-3½x4½	29.4	245.3	101-3600	5.75	40.9	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.54	C			
26	Hupmobile, 8. 925H		125	6.50/16	8-3½x4½	32.5	303.2	120-3500	5.80	44.0	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.Long	WG	m-UP	½ Spi	4.54	C			
27	La Salle.	V8, 39-50 1320	120	7.00/16	8-3½x4½	36.4	322.0	125-3400	6.25	41.4	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC			
28	Lincoln	V12 136-145	136-145	7.50/17	12-3½x4½	46.8	414.0	150-3400	6.38	39.0	Al	Mor	Al	Pur	AC	Str	Own	AL	Exi	P.Long	Own	m-Spi	FF Tim	4.58	C			
29	Lincoln-Zephyr . .	1360 125	125	7.00/16	12-2½x3½	36.3	267.0	110-3900	6.70	40.6	Al	Mor	Dia	CS	Pur	Fram	Str	Own	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr		
30	Mercury	8 116	116	6.00/16	8-3.185x34	32.5	239.0	95-3600	6.15		CI	Dia	CS		AC	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.54	Tr			
31	Nash Lafay	3910 850	117	6.00/16	6-3½x4½	27.3	234.8	99-3400	6.30	36.2	CI	Whit	Als	No	AC	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C			
32	Nash	Amb. 6, 3920 1056	121	6.25/16	6-3½x4½	27.3	234.8	105-3400	6.00	35.0	CI	Whit	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	m-Mec	½ Own	4.10	C			
33	Nash	Amb. 8, 398C 1200	125	7.00/16	8-3½x4½	31.2	260.8	115-3400	6.00	34.9	CI	Dia	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	m-Mec	½ Own	4.10	C			
34	Oldsmobile	60 889	115	6.00/16	6-3½x3½	28.4	216.0	90-3200	6.20	39.0	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC			
35	Oldsmobile	70 952	120	6.00/16	6-3½x4½	28.4	229.7	95-3300	6.10	39.3	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC			
36	Oldsmobile	80 1043	120	6.50/16	8-3½x3½	33.8	257.1	110-3500	6.20	41.1	CI	LB	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC			
37	Overland	102 100	102	5.00/16	4-3½x4½	15.6	134.2	61-3600	6.35		CI	LB	Al	No	AC	Til	Mar	AL	USL	P.Long	WG	m-UP	½ Own	4.30	C			
38	Packard Six	1700 1095	122	6.50/16	6-3½x4½	29.4	245.3	100-3200	6.52	40.7	CI	Mor	Als	Pur	Op	CG		DR	Wil	P	Own	Nb-Mec	½ Own	4.54	IC			
39	Packard Eight 1701-2	1295	127, 148	7.00/16	8-3½x4½	33.8	282.0	120-3600	6.41	41.8	CI	Mor	Als	Pur	AC	Str		AL	PD	P	Own	Nb-Mec	½ Own	(b) 1C				
40	Pack. Sup. 8. 1703-5	2035	127, 148	7.00/16	8-3½x5	32.5	320.0	130-3200	6.45	43.9	CI	Mor	Als	Pur	AC	Str		AL	PD	P	Own	Nb-Mec	½ Own	(s) 1C				
41	Pack. Twelve. 1707-8	4155	134, 39	8.25/16	12-3½x4½	56.7	473.0	175-3200	6.30		Al	Mor	Als	Pur	AC	Str		AL	PD	P	Own	Nb-Spi	½ Own	4.41	IC			
42	Plymouth	P7 726	114	5.50/16	6-3½x4½	23.4	201.3	82-3600	6.70	35.9	CI°	Mor	Ala	No		Car		AL	Wil	P.B&B	Own		½ Own	3.90	IC			
43	Plymouth	P8 791	114	6.00/16	6-3½x4½	23.4	201.3	82-3600	6.70	35.4	CI°	Mor	Ala	Pur		Car		AL	Wil	P.B&B	Own		½ Own	4.10	IC			
44	Pontiac 6.	39-25 866	115	6.00/16	6-3½x4	28.3	222.7	85-3520	6.20	38.4	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.10	IC			
45	Pontiac 6.	39-26 922	120	6.00/16	6-3½x4	28.3	222.7	85-3520	6.20	36.4	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.10	IC			
46	Pontiac 8.	39-28 970	120	6.50/16	8-3½x3½	33.8	248.9	100-3700	6.20	40.9	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.30	IC			
47	Studebaker. Com. 9A	965	116½	6.00/16	6-3½x4½	26.3	226.0	90-3400	6.00	40.7	CI	Dia	Ly	Fram	AC	Str	Buf	AL	Wil	P.B&B	WG	Nb-Spi	½ Spi	4.55	IT			
48	Studebaker. Pres. 5C	1110	122	6.50/16	8-3½x4½	30.0	250.4	110-3600	6.00	41.4	CI	Dia	Ly	Fram	AC	Str	Buf	DR	Wil	P.In	WG	Nb-Spi	½ Spi	4.55	IT			
49	Willys	38 †	100	5.50/16	4-3½x4½	15.6	134.2	48-3200	5.70	32.3	CI°	LB	CI	F-O	AC	Til	Buf	AL	USL	P.R-B	WG	m-UP	½ Own	4.30	C			

ABBREVIATIONS—General
 °—Others also
 *—Measured on rim of Flywheel
 (1) ½ in. on Flywheel rim before TC
 ½—Semi-floating
 ¾—Three-quarter floating
 †—With clearance of .015 the valve is .004 off its seat.
 ‡—Does not include Federal Taxes
 §—Computed on basis of displacement, gear ratio, effective tire

diameter, and weight with normal load.
 (a) —(¼ to ¾)
 A—Above (rods removed from)
 A—After top center
 AA—Automatic adjuster
 Ad—Advanced
 Al—Aluminum
 Ala—Aluminum, Anode processed
 Als—Aluminum with struts
 Au—Automatic
 (b) 4.36-1701; 4.70-1702

B—Below (rods removed from)
 B—Before top center
 Bm—Before marks on vibration damper
 (c) 1-½, 1-¾ C—Conventional
 C—Cold (Tappet clearance)
 CH—Chain
 CHI—Chrome Nickel Iron
 CI—Cast Iron CS—Cast Steel
 CSM—Chain sprocket markings
 (d) —0+0-½ (e) —0+½-0
 (f) —½ to ¾-0

F—Floating (Piston Pin)
 FF—Full floating
 H—Hot (tappet clearance)
 (i) 4900-5100 IC—Independent coil
 IT—Independent Transverse
 Ly—Lynite
 m—Metal with anti-friction bearings
 M—Mechanical N—Negative
 Nb—Needle bearing
 (nn) N1¼ to N2¼ on 61, N¼ to N1¼ on 60S
 p—Plain bearing

P—Piston (Pin Locked in)
 P—Single plate clutch
 PH—Power operated, hyd. brakes
 R—Rod (Pin locked in)
 (r) —Out only Ru—Rubber
 Rb—Roller Bearing
 (s) 4.36-1703, 4.54-1705
 (t) ½ to ¾-0 TC—Top Center
 Tr—Transverse Var—Various
 x—At 1000 R.P.M.
 y—At 2800 R.P.M.

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type			Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	RINGS		Piston Pin Diameter	Piston Pin Locked In	VALVES						IGNITION						FRONT AXLE					Line Number					
						No. and Width Comp.	No. and Width Oil			Head Diameter and Seat Angle			Operating Tappet Clearance		Intake Valve Opens Before or After T.C.	No. of Degrees	No. of Flywheel Teeth	Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Timing		Breaker Housing	Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)		Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)
										Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)						Inlet	Exhaust												Inlet Tappet Clearance for Valve Timing	No. of Occurs °TC	No. of Flyw. Teeth Spark Occurs TC
OM	R	AL-A9	2-3/4	1-1/8	24	R	1 1/2	45	1 1/2	45	.279	.006H	.009H	.011	19B	.022	.025	(1)	Au	A	1 1/8	1 1/4	3	4	11	1 1/4	1 1/8	1 1/2	1			
OH	S	112 AC-46	2(c)	2-1/8	13 1/2	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	++	13B	.015	.025	4B	Au	A	2	1.21	6	13 1/4	N 1/2	1-1/4	1-1/8	3 1/2	2			
OH	S	114 AC-46	2(c)	2-1/8	14 1/2	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	++	14B	.015	.025	6B	Au	A	2 1/4	1.31	8	17	N 1/2	1-1/4	1-1/8	3 1/2	3			
OH	S	114 AC-46	2(c)	2-1/8	14 1/2	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	++	14B	.015	.025	6B	Au	A	2 1/4	1.31	8	17	N 1/2	1-1/4	1-1/8	4 1/2	4			
OH	S	114 AC-46	2(c)	2-1/8	14 1/2	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	++	14B	.015	.025	6B	Au	A	2 1/4	1.31	8	17	N 1/2	1-1/4	1-1/8	4 1/2	5			
BH	S	155x AC-104	2(c)	2-3/4	7 1/2	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	.015	.027	5B	Au	A	2.46	2 1/2	7	(nn)	0-3/4	3/2-3/2	5-6 1/2	6				
BH	S	170x AC-104	2(c)	2-3/4	7 1/2	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	.015	.027	5B	Au	A	2.46	2 1/2	7	(nn)	0-3/4	3/2-3/2	5-6 1/2	7				
BH	S	180x AC-104	2(c)	2-1/8	14 1/2	R	1.50	45	1.37	45	.341	AA	AA	AA	6B	.015	.032	6B	Au	A	2	1.31	11	(nn)	0-3/4	3/2-3/2	5-6 1/2	8				
OH	O	AC-46	2-1/8	1-1/8	.865	R	1 1/2	30	1 1/2	30	.340	.006H	.013H	.006	9B	.021	.040	5B	Au	A	2 1/8	1 1/8	5	14	1 1/4-2 1/4	1/2-1 1/2	6 1/2-8 1/2	9				
OH	O	AC-46	2-1/8	1-1/8	.865	R	1 1/2	30	1 1/2	30	.340	.006H	.013H	.006	9B	.021	.040	5B	Au	A	2 1/8	1 1/8	5	14	1 1/4-2 1/4	1/2-1 1/2	6 1/2-8 1/2	10				
LH	G	145x AL-A7	2-1/8	2-3/8	8 1/2	F	1 1/2	45	1 1/2	45	.340	.010H	.010H	.014	8B	.020	.025	TC	TC	Au	A	2 1/8	1 1/8	5	17	1/2-2 1/2	(a)	0-1/8	4 1/2-6 1/2	11		
LH	G	145x AL-A7	2-1/8	2-3/8	8 1/2	F	1 1/2	45	1 1/2	45	.340	.006H	.010H	.011	2B	.018	.025	3B	1 1/2B	Au	A	2 1/8	1 1/8	6	20	1/2-2 1/2	(a)	0-1/8	4 1/2-6 1/2	12		
LH	G	145x AL-A7	2-1/8	2-3/8	8 1/2	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.014	8B	.020	.025	TC	TC	Au	A	2 1/8	1 1/8	5	19	1/2-2 1/2	(a)	0-1/8	4 1/2-6 1/2	13		
LH	G	140x AL-A7	2-1/8	2-3/8	8 1/2	F	1 1/2	45	1 1/2	45	.340	.006H	.008H	.011	6A	.020	.025	4A	1 1/2A	Au	A	2 1/8	1	5	15	1-3	1/4-3/4	0-1/8	4 1/2-5 1/2	14		
LH	G	150y Ch-H-10	2-3/8	1-3/8	.687	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2B	.015	.025	4B	Au	A	1.60	1.54	4	15.2	8	1	1 1/8-1 1/8	8	15			
LH	G	100 Ch-H-10	2-3/8	1-3/8	.750	F	1 1/2	45	1 1/2	45	.310	.013C	.013C	.013	9 1/2B	.015	.025	4B	1 1/2B	Au	A	2	1.75	5	22	8	1	1 1/8-1 1/8	8	16		
OH	R	160x Ch-H-10	2-3/8	1-1/8	1 1/8	R	1.28	30	1 1/2	45	.18	.010H	.010H	.012	4 1/2B	.018	.025	TC	TC	Au	A	2 1/8	1 1/8	5	13 1/2	3-4	1	1/8-3/8	7 1/2	17		
OH	R	120 Ch-H-10	2-3/8	1-1/8	1 1/8	R	1.28	30	1 1/2	45	.18	.010H	.010H	.012	4 1/2B	.018	.025	4A	1 1/2A	Au	A	2 1/8	1 1/8	5	13 1/2	3-4	1	1/8-3/8	7 1/2	18		
BH	G	115 Ch-J-8	2-3/8	2-3/8	3/4	F	1 1/2	45	1 1/2	45	.006H	.008H	.010	10 3/8B	4B	.020	.032	2 1/2	C	Au	A	1 1/2	1 1/2	4	12 1/2	1-2	1-1 1/2	0-1/8	7	20		
BH	G	120 Ch-J-8	2-3/8	2-3/8	3/4	F	1 1/2	45	1 1/2	45	.006H	.008H	.010	10 3/8B	4B	.020	.032	TC	TC	Au	A	1 1/2	1 1/2	4	12 1/2	1-2	1-1 1/2	0-1/8	7	21		
BH	G	120 Ch-J-8	2-3/8	2-3/8	3/4	F	1 1/2	45	1 1/2	45	.006H	.008H	.010	10 3/8B	4B	.020	.032	TC	TC	Au	A	1 1/2	1 1/2	4	12 1/2	1-2	1-1 1/2	0-1/8	7	22		
BH	G	118 Ch-J-8	2-3/8	2-3/8	3/4	F	1 1/2	45	1 1/2	45	.006H	.008H	.010	10 3/8B	4B	.017	.032	TC	TC	Au	A	1 1/2	1 1/2	4	12 1/2	1-2	1-1 1/2	0-1/8	7	23		
LH	G	107 Ch-7	2-1/8	2-3/8	7 1/8	F	1 1/2	45	1 1/2	45	.341	.010	.014	.013	2B	.022	.028	7B	Au	A	2 1/8	1 1/8	6	18		1	1 1/8	7 1/2	24			
LH	G	107 Ch-7	2-1/8	2-3/8	7 1/8	F	1 1/2	45	1 1/2	45	.341	.010	.013	.014	2B	.022	.028	7B	2 1/2B	Au	A	2 1/8	1 1/8	6	18		1	1 1/8	7 1/2	25		
LH	G	113 Ch-7	2-1/8	2-3/8	7 1/8	F	1 1/2	45	1 1/2	45	.341	.006	.013	.010	1A	.015	.028	7B	2 1/2B	Au	B	2 1/4	1 1/8	8	21.5	1 1/2	1 1/4	1 1/8	8 1/2	26		
BH	S	155x AC-104	2(c)	2-3/8	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	.015	.027	5B	2 1/4B	Au	A	2 1/8	2 1/2	7	(N 1/2-N 1/2)	0-3/4	3/2-3/2	5-6 1/2	27			
OM	O	105 Ch-7	2-1/8	2-3/8	7/8	F	1 1/2	45	1 1/2	45	.311	AA	AA	AA	21B	.024	.029	7B	2 1/4B	Au	B	2 1/8	2	12	32	1 1/2	1	1 1/8	7 1/2	28		
BH	G	105 Ch-H-10	2-3/8	1-3/8	3/4	F	1.54	45	1.45	45	.311	AA	AA	AA	19 1/2B	.015	.029	4B	1 1/2B	Au	A	2 1/8	1.57	5	30	4	3/4	1 1/8-1 1/8	4	29		
BH	G	Ch-H-10	2-3/8	1-3/8	3/4	F	1 1/2	45	1 1/2	45	.310	.013C	.013C	.013	9 1/2B	.015	.025	4B	1 1/2B	Au	A	2.14	1.75	5						30		
BH	G	110 AL-B7	2-1/8	2-3/8	7/8	F	1 1/2	45	1 1/2	45	.340	.015	.015	.015	CSM	.020	.025	TC	TC	Au	A	2	1.42	6	20	1-2	0-1 1/2	0-1/8	7	31		
BH	G	125 AC-45	2-1/8	2-3/8	7/8	F	1 1/2	45	1 1/2	45	.372	.015	.015H	.015	CSM	.020	.025	4B	1 1/2B	Au	A	2	1.42	6	16	1-2	0-1 1/2	0-1/8	7	32		
BH	G	110 AC-45	2-1/8	2-3/8	7/8	F	1 1/2	45	1 1/2	45	.372	.015H	.015H	.015	CSM	.020	.025	9B	2 1/2B	Au	B	2	1.24	7	17	1-2	0-1 1/2	0-1/8	7	33		
BH	S	151x AC-45	2-3/8	2-3/8	8 1/2	P	1 1/2	30	1 1/2	45	.008H	.011H	.012	5B		.020	.040	TC	TC	Au	A	2 1/8	1 1/8	5	17	0-N 3/4	1/2-1	1/8-1/8	4-5 1/2	34		
BH	S	146x AC-45	2-3/8	2-3/8	8 1/2	P	1 1/2	30	1 1/2	45	.008H	.011H	.012	5B		.020	.040	TC	TC	Au	A	2 1/8	1 1/8	5	17	0-N 3/4	1/2-1	1/8-1/8	4-5 1/2	35		
BH	S	152x AC-45	2-3/8	2-3/8	8 1/2	P	1 1/2	30	1 1/2	45	.008H	.011H	.012	TC		.015	.030	2B	3/4B	Au	A	2 1/8	1 1/8	6	24	0-N 3/4	1/2-1	1/8-1/8	4-5 1/2	36		
LH	G	105 Ch-J-8	2-3/8	1-1/8	1 1/8	R	1 1/2	45	1 1/2	45	.373	.014C	.016C	.020	9B	.020	.025	TC	TC	Au	A	1 1/8	1 1/8	4	11 3/4	3	2	1 1/8-1 1/8	7 1/2	37		
H	O	AC-103 (z)	2-1/8	1-1/8	7/8	F	1.57	30	1 1/2	45	.340	.007H	.010H	.012	1B	.020	.028	6B	1 1/2B	Au	A	2 1/8	1 1/8	5	15	1 1/2-2 1/2	(t)	(e)	1-54	38		
H	O	AC-103 (z)	2-1/8	1-1/8	7/8	F	1 1/2	30	1 1/2	45	.340	.007H	.010H	.012	1B	.020	.028	6B	1 1/2B	Au	A	2 1/8	1 1/8	5	15	1 1/2-2 1/2	(t)	(e)	1-54	39		
H	O	AC-103 (z)	2-1/8	1-1/8	7/8	F	1 1/2	45	1 1/2	45	.340	.006H	.008H	.005	26B	.015	.028	7B		Au	B	2 1/8	1 1/8	7	22	0-1 1/2	(t)	(e)	1-54	40		
BPH	O	AC-103 (z)	3-1/8	1-3/8	7/8	F	1 1/2	45	1 1/2	45	.340	AA	AA	++	TC	.020	.028	6B	2B	Au	B	2 1/2	1 1/8	10	40	(d)	1-1/4	(f)	1-30	41		
LH	G	145x Ch-J-8	2-1/8	2-3/8	8 1/2	F	1 1/2	45	1 1/2	45	.340	.006H	.008H	.011	6A	.020	.025		Au	A	1 1/8	1	5	14	-1/2 to +1/2	-1/2 to +1/2						

Engine Tuning

(Continued from page 29)

1. Check the operation of the accelerator pump for delivery of the full fuel charge; if unsatisfactory, check the condition of the accelerator pump plunger and replace the plunger, if necessary.

2. Check the proper seating of the economizer valve. Leaking of this valve causes a constant dripping of fuel from the economizer jet.

3. Check the carburetor for dirt and for plugged jets.

4. Check height of fuel level in the carburetor float chamber. Too high a level may cause flooding, difficult

starting, and poor economy. Too low a level may cause loss in top speed or in power at full throttle, also difficult starting.

5. While checking the fuel level, the float valve should be examined, to make certain it is not leaking or sticking.

AUTOMATIC CHOKE—Regarding vehicles equipped with automatic chokes there is a tendency for operators and mechanics to feel that this unit is involved in many complaints of poor performance, including starting, economy and general operation.

Actually the automatic choke rarely causes difficulties, hence adjustments should not be attempted until the fuel and electrical systems have

been found in proper adjustment and operation.

1. Where it is found that the automatic choke is functioning improperly, then, and only then, search should be made for accumulated gum from oil and dirt on the shaft and for possible maladjustment of the linkage.

2. Most automatic chokes require no lubrication; if the manufacturer's specifications do call for lubrication, only the prescribed lubricant should be employed.

ELECTRICAL SYSTEM—Because the electrical system consists of a number of units, it is necessary to see that each is in proper adjustment and good mechanical condition.

The checking of the electrical units should follow a definite course, such as the following:

DISTRIBUTOR—1. Clean all dirt and oil from the distributor cap and see that there are no cracks or burned tracks caused by cross-firing through dirt and oil.

2. Make certain that the high-tension wires at the distributor are properly seated in the cap and that the terminals are free from green oxide.

3. Arrange the grouping of the high-tension wires from the distributor to the spark plug so as to have uniform spacing between the several wires.

4. Check for an improperly seated or broken rotor and for worn or missing center lead carbon.

5. Check the primary leads or pig-tails in the distributor; see that they are not caught or pinched under the distributor cap.

6. In the examination of the distributor, any evidence of brass cuttings indicates improper seating of the distributor cap. In such a case the cap must be checked for any damage that would call for replacement and the breaker box should be thoroughly cleaned of such cuttings as well as of dirt and oil.

7. After the breaker box has been cleaned, the breaker points should be checked for correct spacing and if there has been a transfer of metal from one point to the other, the points should be dressed or replaced and then adjusted to specifications.

8. Where burned points are found and there is no oil present, the voltage regulator should be checked to make sure it is regulating the voltage to the proper amount as measured at the regulator terminal.

9. The ignition timing should always be checked and correctly set when any attention is given the distributor. When making this check with a timing light, be sure to check the action of the automatic advance to see that it does not fluctuate at idling speeds and that it advances properly on acceleration.

SPARK PLUGS—When spark plugs are being checked, it is well to observe certain precautions.

1. The exterior portions of the plugs should be cleaned,

2. The spark plug electrodes should be correctly spaced.

3. If there is an oxide coating on the internal porcelain and electrodes, the plugs should be cleaned by sand blasting. If they have been in service for 10,000 or more miles, it may be necessary to replace them.

IGNITION COIL—The high efficiency ignition coils used today are rugged and seldom cause difficulty, as

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Lifetime EQUIPMENT

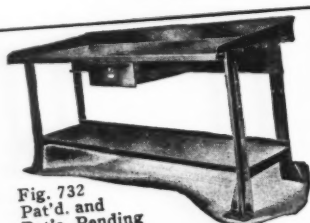


Fig. 732
Pat'd. and
Pat's. Pending
Drawer is extra.

"HALLOWELL"
STEEL WORK-BENCH

Strong, rigid, with one piece, smooth steel top, easy to keep clean. Of welded construction, they can't get wobbly—and can't splinter or burn. Best of all, they're inexpensive. Of the 1368 types and sizes, there's one made exactly for you. Bulletin gives details.



Fig. 992

"HALLOWELL"
SEMI-PORTABLE
STEEL WORK-BENCH

A great favorite in Automotive Repair Shops. In a way it suggests a wheelbarrow; grab the handles and trundle the "Hallowell" around anywhere. Let go, and it lands on its plain feet, when it becomes a perfectly steady work-bench. Handles swing down and out of the way when not in use, and to prevent shimmying the casters do not swivel. Write for Bulletin.

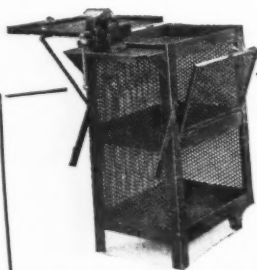


Fig. 1112

"HALLOWELL" STEEL TOOL STANDS

A Stand that can be locked, yet is always open for inspection as to its contents. Portable—able to be moved from job to job—wherever it's required! No wonder hundreds are used in the motor industries. There's a type for every purpose.

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long as they are kept clean and the terminal connections remain tight.

RADIO SUPPRESSORS—Since many cars and trucks are equipped with radio receiving sets, there is another possible source of electrical difficulty in the suppressors which may be on each of the spark plug terminals or at the distributor end of the high-tension cable.

The center lead suppressors are commonly in use now and require no attention except to see that they are properly sealed against moisture. If they are not properly sealed, starting is likely to be difficult in damp weather.

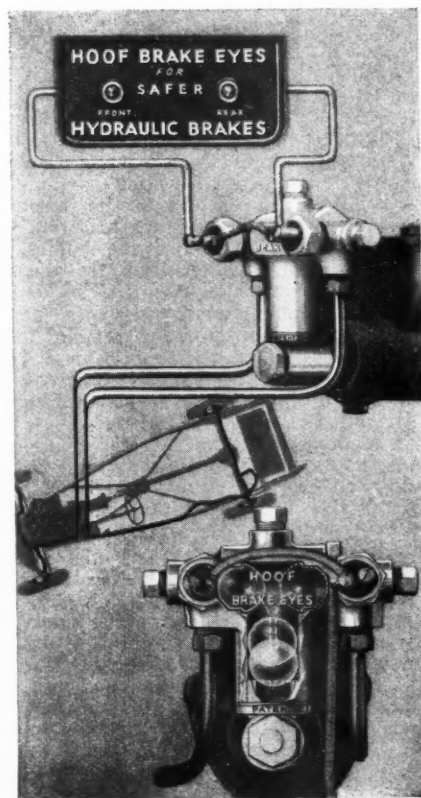
The suppressors at the spark plugs do not ordinarily cause any difficulty if they are kept in good mechanical condition and free of dirt, grease or oil.

CONCLUSION—A careful check of all units through the use of modern testing equipment is easily made in a minimum of time and such testing equipment operated by a capable mechanic removes the necessity for guessing at the condition of the different units.

The proper use of such testing equipment is therefore very desirable and every Service Station can profit by its use and thus avoid repeated complaints that are the result of less thorough inspections and adjustments.

Safety Device for Hydraulic Brakes

A new safety device, known as Hoof Brake Eyes, has been announced by the Hoof Products Co., 162 N. Franklin St., Chicago, Ill. The device consists of a unit which is attached to the master hydraulic brake cylinder, and a dash signal. The unit contains a balanced Neoprene ball which moves



up and down with the flow of brake fluid until a leakage occurs, when it is forced into a special seat, sealing the defective line. The dash signal consists of two red "eyes" marked "front" and "rear." When the brake line is sealed by the ball, the signal indicates whether the failure is associated with the front or rear brakes.

Glycerine Recommended as Rubber Lubricant

Lubricating the rubber shackles when they develop squeaks is often a problem, as oil and grease cannot be used because of their known deterior-

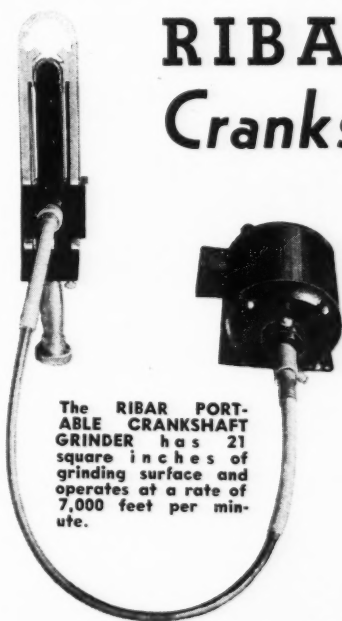
ating effects which may cause rubber parts to rot.

In this connection a simple mixture of two parts alcohol to one part of glycerine is a recommended lubricant. The alcohol evaporates after the solution is applied by the usual oil-can method, leaving the glycerine which acts as the anti-friction agent.

In addition to its function as a lubricant, glycerine is also known to have a beneficial effect upon the rubber, maintaining it in its firm resilient condition and preventing excessive drying. The film of glycerine also acts to protect the rubber parts from the action of gasoline, oil, and grease, because glycerine is not miscible with these substances.

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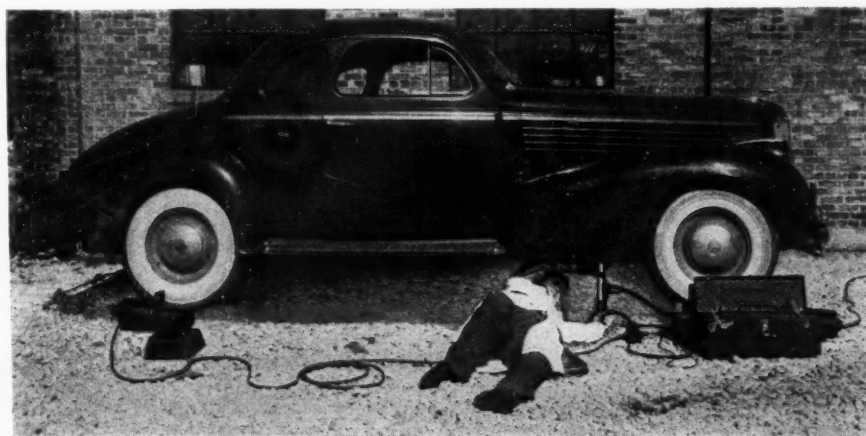
Grind crankshafts without removing the motor—make profits the easy way with the NEW RIBAR PORTABLE CRANKSHAFT GRINDER. All you do is jack up the car, remove the oil pan and connecting rod bearing bolts and attach grinder. Thirty minutes' grinding gives you true crank pin results. Universal for all passenger car, truck and bus engines with crankshaft diameters of 1 3/4" to 2 5/8" inclusive. The only machine of its kind on the market. Write today for complete details.

You can buy the RIBAR PORTABLE CRANKSHAFT GRINDER on a 20% down, balance within 12 months basis through our arrangement with a commercial credit company. Ask us about this plan.

Sole Manufacturers

THE BROWNIE TOOL CO.

MINOOKA, ILLINOIS, U. S. A.



Oldsmobile

(Continued from page 25)

ENGINES—Save for many detail changes, the engines remain substantially the same. The 37/16 x 3 3/4 in. engine for the 60 is interchangeable, in the main, with the 37/16 x 4 1/4 in. 70, six-cylinder engine, except for shorter stroke. The 216 cu. in. 60 six cylinder engine develops 90 hp. at 3200 r.p.m., while the 230 cu. in. 70, six cylinder engine develops 95 hp. at 3200 r.p.m. The horsepower of the Eight is given as 110 hp. at 3500 r.p.m.

Engine mounting consists of three rubber-to-metal pedestals, one at the

front, two at the rear of the clutch housing. The front mounting is of special design with an interlocking channel section which permits engine oscillation but prevents any forward or backward movement.

Oil pump operation is given greater protection by the introduction of a freeze-proof by-pass built into the pump screen and cover, so arranged that when oil is too thick to pass through the screen it will, nevertheless, by-pass the screen and pass into the pump.

The leak-proof ball bearing water pump adopted by Olds last year is continued. The automatic choke is built into the carburetor and controlled by exhaust manifold tempera-

ture; it has no external linkage commonly used heretofore. Starting is by coordinated starter and throttle system operated by the accelerator pedal.

An outstanding feature of the 1939 Oldsmobile chassis is its new coil spring rear suspension with two rear stabilizer arms taking all drive and braking torque. These stabilizer arms are attached to the axle through rubber insulators and extend to the rear of the axle housing forming the coil spring seat and extend forward in a straight line to a frame mounting near the X-member. These two arms are spaced approximately 10 in. apart at their front end and provide a natural stabilizing effort as the up and down movement of either wheel is resisted by the torsional rigidity of these arms.

The position of the frame in relation to the axle is maintained by a lateral stabilizer bar which is mounted in rubber at both the frame and axle end. Double acting shock absorbers of the "end to end" discharge type mounted on the axle housing provide the necessary shock absorber control.

To complete the ride control picture, there is the sway bar at the front end mounted ahead of the front axle, fully cushioned in rubber at all points. Front suspension is similar to former design but has been changed in some respects. For example, the lower control arms now are made of pressed steel with heavy channel sections, replacing the former forgings. The lower arms are pivoted in threaded bearings provided with rubber seals to hold lubricant and keep out water and dirt.

A new steering linkage has been developed for the new cars. In Oldsmobile's dual center-control steering, there is a relay link extending across the car from the pitman arm on the left, to a corresponding idler arm on the right and so pivoted that the relay link moves parallel to the axle at all times. Short tie-rods then connect from the link to each wheel arm. Pivot points have been arranged in relation to the fulcrum of the front suspension system to provide perfect steering geometry characteristics.

The new frames are extremely rigid due to the use of an I-section X-member whose arms extend to the front cross member. The frames are reinforced for convertible coupe bodies, embodying a special pressed steel section that is fastened over the center section of the X-member.

While a conventional type of clutch is used, similar to the former model, it has been greatly simplified by the use of a unique type of carbon block throwout bearing. A lighter clutch disc is employed permitting easier and more rapid shifting of gears due to decreased inertia. Clutch pedal pressure has been reduced materially by the introduction of an over-center clutch spring mounting in which the spring provides a servo action.

The new remote gear shift control comprises a control lever on the steering column, with a ball joint at its inner end pivoted in the housing for up-and-down movement for the crossover. The one shaft operates both the gear shift and crossover mechanism, the latter being accomplished by means of a simple Bowden wire connection. (See next page.)



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BRAKE LINING

See us at Booths 83-85-87 AUTOMOTIVE SERVICE INDUSTRIES SHOW, Chicago, Dec. 5 to 10

The synchro-mesh transmission is entirely new, somewhat shorter, lighter in weight but more rigid. However, the size of gears and torque capacity remain the same as before.

Cadillac-La Salle

(Continued from page 15)

radiator core, instead of cellular cores. They are lower and wider to suit the new hood contours, and also more rugged, permitting relief-valve pressures up to 5½ lb. per sq. in. In Series 90 the relief pressure remains 7 lb. per sq. in.

The Carter carburetor is continued on the LaSalle, and the Stromberg on the Cadillac Eights. On the Stromberg carburetor the electrically-heated choke has been superseded by one actuated by exhaust-manifold temperature, for the sake of simplicity. Valve-tappet parts are Ferrox-treated. There are new rubber bushings in the inner ends of the lower control arms of the front independent suspension. These arms are pressings instead of forgings, and they, as well as the knuckle-pin supports, have been redesigned for increased strength and road clearance. Each lower arm is supported upon a stationary shaft bracketed to the frame crossmember, and the two are riveted together to form the "wish-bone." The torsion-rod front stabilizer bar has been stiffened and the front-spring coils are smaller in diameter.

Fabric covers now enclose the ends of the two longest liners of the rear springs. The so-called "high-plane" Hotchkiss drive of the LaSalle and Cadillac 61 is claimed to combine riding comfort with road-ability. Rear springs on these two models are mounted inside the frame side-bars; tension shackles have replaced compression shackles, the shackles as well as the rear-spring front eyes have rubber bushings at top and bottom, and no lubrication is required. On the Series 75 and 90, inertia-control of the rear shock absorbers has been discontinued, manual control being now standard.

On Series 50 and 61 the three-pass muffler, which has taken the place of the former "straight-through" type, has a heavier double-wrapped outer shell made of terneplate. The muffler is supported by rubber insulators at both ends, while the tail pipe is supported by a fabric-and-rubber insulator. On the 60S, 75 and 90 the new muffler is said to reduce the back pressure by 40 per cent.

A new clutch-driven disk has been adopted for all series except the Sixteen. It is cut into a number of segments, each "waved" to make it act as a cushion, and the greater uniformity of pressure distribution has permitted reducing the diameter on the LaSalle to 10 in.

Adjusting devices on the new streamlined headlamps are more accessible. The vertical adjustment is at the bottom of the lamp, while the horizontal adjustment is made by means of a screw on the inside edge of the lamp, immediately behind the lens, and between it and the radiator casing.

The new Cadillac commercial line comprises three chassis, viz., Series 50 with 156½-in. wheelbase, Series 61

with 162¼-in. wheelbase, and Series 75 with 161¾-in. wheelbase. The Series 65 has been discontinued.

Series 51 and 61 commercial chassis have the same new features as the 1939 passenger-car chassis. All frame sidebars are one-piece construction; the sidebars and X-members are of heavier stock than used in the passenger-car frames. Wider brake drums (2¼-in.) are used on the front wheels. There are special springs front and rear, six-ply tires, 18 points of body attachment, etc. The wheelbase of the LaSalle chassis is 3¾-in. shorter than in 1938, which improves maneuverability, yet the useful chassis length is greater.

There are few changes in the Series

75 Commercial chassis, except as regards appearance features. The new 6.7 compression ratio increases the power in all gears, but ethyl gasoline or its equivalent is required. A moderate-compression engine, which will burn regular-grade fuel satisfactorily, can be had on special order.

Six Month Car Sales

Retail sales in the United States for the first eight months of 1938, as reported by the Automobile Manufacturers Association, were: 1,248,672 passenger cars and 276,664 trucks. This is a decided drop from the 2,693,779 passenger cars and 496,481 trucks sold in the same period in 1937.



\$1.40 per pint net to dealer. Slightly higher in Canada.

Cold Weather is Sure-Weld Time

Sure-Weld gives a permanent repair to cracks in valve ports, cast iron and aluminum cylinder heads, inside cracks and water jackets . . . in only 30 minutes time. It's an ideal precaution against anti-freeze losses . . . and a sure-fire repair on leaks resulting from lack of anti-freeze.

Sure-Weld will not clog radiators and has a cleansing effect on the entire cooling system. It's tried and tested . . . and fully guaranteed.

Be sure you are set to cash in on this profitable business. Your jobber can supply you.

SURE - WELD

KLEERUST

FOR CONDITIONING THE COOLING SYSTEM AT ANTI-FREEZE TIME

Kleerust not only removes cooling system rust, but rust-proofs all metal for an entire year. And it's not even necessary to drain the cooling system.



Kleerust works while the car remains in operation. It does not affect anti-freeze and is not affected by it. In fact it adds a protective seal that helps to retard evaporation. Here is just the product your customers will want for cooling system servicing. Order from your jobber now!

Dealer's net price 60¢ pint in doz. lots. Slightly higher in Canada.

HEADLIGHT REFLECTORS NEED COLD WEATHER CONDITIONING TOO!



Colder weather usually means stormier weather and tougher driving conditions. Headlights more than ever must be in perfect working order. That's where Sure-Plate comes into its own. Sure-Plate guarantees perfect re-silvering at an operating cost of about 25¢ on jobs that normally sell from \$2.00 to \$3.00. The profit is high and the cost of the complete re-silvering equipment so low that it will pay for itself with the first dozen jobs. Make your place headquarters for headlight reflector jobs. Order from your jobber today.

"B" Assortment \$12.50 net to dealer. Slightly higher in Canada.

SURE-PLATE

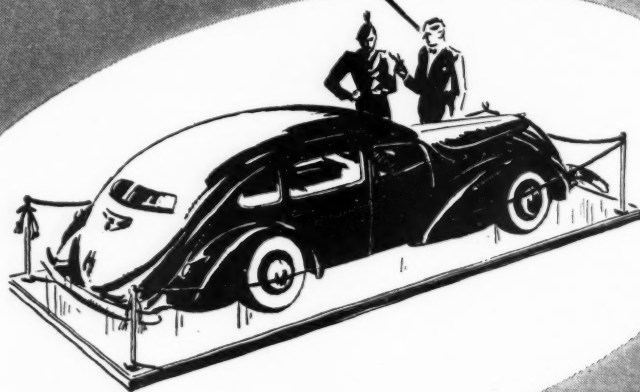
IN CANADA
SURE-RITE PRODUCTS, Canada, Ltd.
20 HAYTER STREET, TORONTO

EXPORT DEP'T.
REX-HIDE EASTERN, INC.
33 W. 60TH STREET, NEW YORK CITY

SURE-RITE PRODUCTS CORP., 6010 N. CAMAC ST., PHILA., PA.

AFTER THE SHOW

**"...AND THIS CAR WILL PERFORM
BETTER THAN ANY CAR
YOU'VE EVER DRIVEN !"**



ETHYL GASOLINE CORPORATION *manufacturer of*

COMES THE SHOWDOWN!

No matter how sleek and eye-appealing those new 1939 models are, their road performance depends on the grade of gasoline used...and that's where you come in.

SOME of your best customers are buying new cars right now. They expect big things from those 1939 models—surging power, flashing acceleration, flexibility they didn't have in their old trade-ins.

The automobile companies have done all they can to make these expectations come true—by improving engines, transmissions, clutches, etc. But, basically, the performance of these new cars is in *your* hands . . . for it depends on the *grade of gasoline* used and the spark setting. Here's how to explain it to your customers:

The farther you advance the spark of a modern high compression car, up to the point of maximum efficiency, the more power you get from gasoline.

But the motor “knocks” or “pings,” loses performance, when the spark is set farther ahead than the “anti-knock” quality of the gasoline permits.

Judged by anti-knock quality, there are *three* grades of gasoline: “low grade,” “regular” and gasoline containing “Ethyl.”

That is why your 1939 car has a device—

variously called “distributor adjuster,” “Octane Selector,” etc., for setting the spark for each of these three grades of gasoline.

And the performance of your car depends on the grade of gas and spark setting:

EVERY MODERN CAR OFFERS THESE 3 CHOICES



Poor performance with “low grade” gasoline

There is no anti-knock fluid (containing tetraethyl lead) in “low grade” gasoline. Power is lost because the spark must be retarded to prevent “knock” or “ping.”



Good performance with “regular” gasoline

Most regular gasoline has in it anti-knock fluid (containing tetraethyl lead). The spark can be considerably advanced for more power without “knock” or “ping.”



Best performance with gasoline containing “ETHYL”

Gasoline “with ETHYL” is highest in all-round quality. It has *enough* anti-knock fluid (containing tetraethyl lead) so that the spark can be *fully* advanced for maximum power and economy without “knock” or “ping.”

anti-knock fluids used by oil companies to improve gasoline

Cut Window Cleaning Cost After Spray Painting

Cleaning the windows of buildings or cars that have been spray painted is often a difficult problem. In this connection, therefore, the successful results reported by a large Middle Western electric railway and light company (Milwaukee Electric Railway and Light Company) through the use of a glycerine solution are of general interest.

Previous to the use of the glycerine solution, a variety of other solutions were tried. At first the windows were coated with a solution of calcium

chloride before spraying, but it was found unsatisfactory in that on some days the calcium chloride solution ran over the surface to be painted, necessitating extra time and labor to wipe it off, while under other weather conditions it dried hard, thus not only increasing the cost of the window cleaning through difficulty of removal but often resulting in window breakage. A solution of glycerine and whiting was tried and was found to act the same under all weather conditions, with a marked decrease in time and effort to clean the windows.

To determine more exactly the overhead saving with the glycerine solution, the company made time studies

on several types of cars. One type of car, which previously required 13 hours, required only nine, with other types showing approximately the same results. While the initial cost of the glycerine solution is higher than that of the calcium chloride solution, the company estimates that the saving in window breakage alone covers the additional cost.

Goodrich Heater

Leading the line of hot water heaters of the B. F. Goodrich Co., Main St., Akron, Ohio, is the new Model 81, illustrated. Twin-fan heat circulation is one feature of the new heater, as well as double outlets allowing defrosters to be used on both sides of the windshield. One fan provides an individual blower for down draft heat circulation throughout the car, while the second circulates the heat for clearing the windshield. Circular foot-



warmer openings are located at the rear corners of the heater, directing heat around passenger's feet, and a connection is provided for throwing heat into the rear of the car. Temperature regulation is controlled by a valve governing the flow of hot water. The heater is trimmed in satin finished statuary bronze and chrome.

Drain and Spark Plug Gasket Assortment

Champ-Items, Inc., 6191 Maple Ave., St. Louis, Mo., has announced a new gasket assortment containing six different types of gaskets to service both drain plugs and spark plugs on all popular cars. Each type of gasket



is painted a distinctive color to simplify selecting the correct part. Gaskets are packed in a handy hinged-lid box that saves space and are accompanied by a color identification chart.

PARCO
THE RECOGNIZED PIONEER REBUILDERS.
FACTORY PRODUCTION METHODS

ANNOUNCES

A NEW AND IMPROVED SYSTEM
OF RECONDITIONING

FORD SHOCK ABSORBERS



Rebuilt under the

**SYNCHRO
SYSTEM**

WE are always reaching out for new and better methods, and are glad to announce to the Repair Trade that PARCO Ford Shock Absorbers will in future be rebuilt under the SYNCHRO SYSTEM.

Being pioneer rebuilders, our long experience and technical knowledge enable us to appreciate the many advantages embodied in the SYNCHRO SYSTEM of rebuilding.

Under the new system your jobber is enabled to give you in exchange an even better PARCO unit than in the past. These units are fitted with the new patented impeller and component parts. No matter how badly worn a shock may be, the SYNCHRO System restores it equal to new. No grief—no comebacks. Perfect functioning. Car owner satisfaction assured.

PARCO Rebuilt Units come to you properly adjusted. An improved method of sealing, in combination with a special high ratio fluid, enables us to guarantee each shock for 10,000 miles of satisfactory service.

Don't trade in your old shocks for those of questionable quality. Look to the organization back of the product.

PARCO SHOCK ABSORBERS, made under the SYNCHRO System, are not to be confused with so-called "Reconditioned" units. They are "TRULY REBUILT." The only shock offered to the independent trade that has new working parts. Remember, when you exchange for a PARCO you get a unit that is backed by a responsible organization that employs factory production methods. A concern with an established reputation for dependability.

Demand Parco Rebuilt Shocks from your Jobber. Don't take a substitute. If he can't supply you send us his name.

PARTS MANUFACTURING CORP.

199-201 So. Portland Avenue, Brooklyn, N. Y.

Licensed by

SYNCHRO MANUFACTURING CO.

Subsidiary of Hygrade Products Co., 516 West 34th Street, New York.

OTHER PARCO FACTORY REBUILT UNITS: DISTRIBUTORS, CARBURETORS

Ask your Jobber for these Parco Guaranteed Units.



You'll Profit with this LITE that shouts

At last! A GIANT LITE! A stoplight that CAN BE SEEN easily at 1000 feet. Makes possible greater safety. For trucks, buses, and passenger cars. Furnished with flush mounting or angle bracket. White lens available for use as a back-up lamp.

Ask your jobber or write.

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LAMP COMPANY

1458 S. Michigan Ave., Chicago

Flares (Electric and Oil) • Tiger-Ey and Knobby Reflex Devices • Foglights • Stop and Tail Lamps and Specialties



RINGS...?

You'll need a K-D 875 Piston Ringer to remove and install rings... it handles all types and sizes up to 4", quickly, easily, safely. Cut fingers and stretched rings can be avoided. Only \$1.35 List.

Ask your Jobber for Dealers' Net Prices

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1. Increases washing profits.

2. Reduces washing costs.

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Motors, Parts, Garage
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**Write At Once
For Details**



CLEANS
CARS
BUSSES
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FASTER
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EXPERTLY TESTED



COMPLETE
AUTOMOTIVE
CHEMICAL LINE

HYDRAULIC BRAKE FLUID

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GALLONS

QUARTS
PINTS

FLARE (formerly Flash) LABORATORIES

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for PERFORMANCE and DEPENDABILITY
"NIEHOFF" QUALITY
TAKES
Resistance OUT OF COIL SALES

The Niehoff High Speed, Heavy Duty "H" Coil is scientifically engineered to adequately meet the exacting demands of all modern six, eight and twelve cylinder motors. Avoid comebacks, dissatisfied customers and profit losses by featuring this type "H" coil that is giving full satisfaction every day to thousands of car owners. See the big, powerful spark that guarantees easy starting with minimum battery drain, and provides plenty of reserve power to handle radio and other accessories. Perfectly balanced to deliver the punch needed for sure starting in cold weather. Take advantage of this certified sales opportunity. See your jobber TODAY and assure yourself of Bigger ignition parts Profits. Attractive catalog with price list on request. Arrange NOW for a Bigger Profit margin by selling the GENUINE NIEHOFF LINE.

BRANCH: 1342 S. Flower, Los Angeles, Cal.

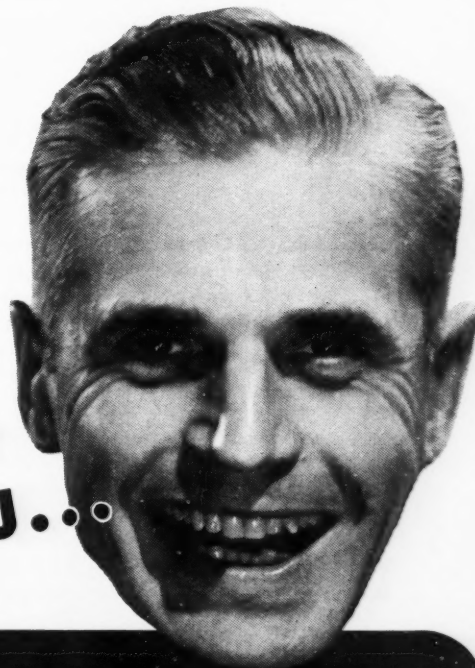


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★ENGINEERED FOR ACCURATE PERFORMANCE AND DEPENDABILITY★

Yes,
You...



If you service cars, you can do motorists a favor by digging out "dead" thermostats. Restore the savings of motor temperature control and the comfort of quick, hot water heater action—at a good profit.

DOLE Replacement and Special Hot Water Heater
THERMOSTATS

See page 71

WESCO Chains



for
More
Sales

WESCOS sell faster because they are "more chain for the money," are beautifully finished, with heavy hardened brass plate cross chains—have easy on easy off fasteners, are put up in attractive display boxes, give satisfaction and build repeat business. WESCO Emergency Chains are self-selling with these patented features: Non-turning, Easy-to-put-on, Self Tightening, Double Locking Buckle; weather-proof cross strap.

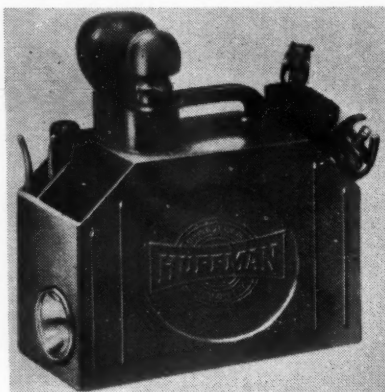
Write for Circular TODAY!

WESTERN CHAIN PRODUCTS CO.
1812 Belmont Ave. Chicago, U. S. A.

There's a WESCO Warehouse near you

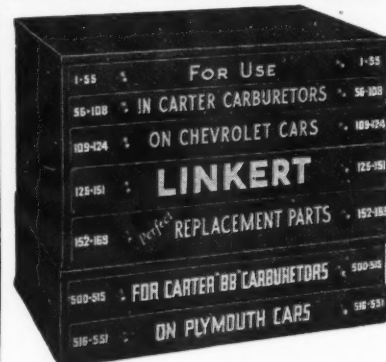
Battery Service Kit

A handy new battery service kit which holds hydrometer, battery syringe, terminal nuts and bolts and all other battery service tools has been announced by the Huffman Mfg. Co., Davis & Gilbert Aves., Dayton, Ohio. Constructed of glossy, soft red rubber



to prevent breakage, the kit contains a one-gallon rubber jug for battery water and a lantern with unbreakable lens.

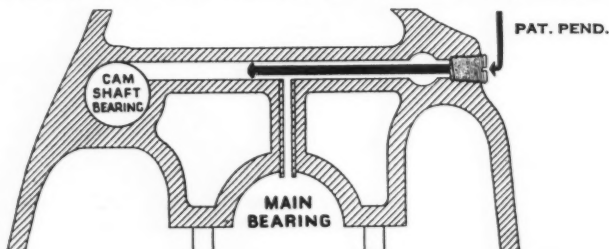
YOU NEED THIS LINE LINKERT PERFECT ENGINEERED PARTS FOR CARBURETOR REPLACEMENTS



**CORRECT ASSORTMENTS
FOR
CHEVROLET
AND
PLYMOUTH**

LANGSENKAMP-LINKERT CARBURETOR CO.
INDIANAPOLIS - INDIANA

GARAGE MEN WELCOME NEW THEXTON OIL PRESSURE REGULATOR



WEAR at the cam shaft bearing, in cars using the pressure system of lubrication, lets too much oil escape at that point. This cuts down the oil pressure and the amount of spray at main and connecting rod bearings, thus reducing the only lubrication received by cylinders and wrist pin bearings. This serious problem has been difficult to correct in the past.

The easily installed Thexton Oil Pressure Regulator, specially designed for Chrysler-built cars, eliminates excessive oil leakage at the worn cam shaft bearing, thus restoring the necessary pressure simply, efficiently, economically. It has been enthusiastically received by garage men. If you haven't seen it yet, ask your jobber or write to us for full information.



Thexton MANUFACTURING COMPANY, Inc.
Established 1907

(Makers of the well-known Thexton Piston Expander)

Minneapolis, Minnesota

Kansas City Los Angeles New York City Portland Seattle
Canadian Branch: Toronto, Ontario

Hudson

(Continued from page 22)

the power has been increased from 83 to 86 hp. as the result of improved carburetion and a 1¼-in. carburetor throat instead of the 1½-in. used last year. Metering pins are now vacuum operated. On the six-cylinder models oil circulation has been improved with direct flow of oil to the troughs from which No. 1 and No. 6 main bearings are fed. Bearing metal from main and connecting rod bearings has also been improved and is now of the non-crystallizing type.

Distributors have been changed so that the breaker points are now placed above the actuating cam so that no grease can fall on the points, thus increasing their life and reducing the possibility of missing.

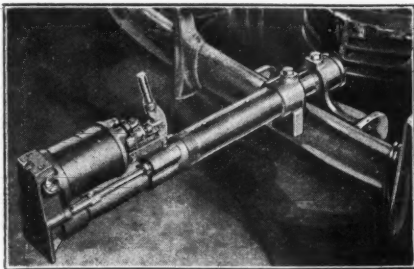
Engine dimensions remain unchanged, but cooling has been improved as a result of the effectiveness of the side-mounted radiator grilles.

In connection with the transmission control system, the changes due to the Handy Shift remote control are practically all in the transmission cover plate and in the actuating mechanism rather than in the transmission itself.

Appearance of the new cars can be realized by a study of the illustrations. The interiors feature greatly improved quality of upholstery and luggage space has been increased in all cars.

Automotive Economics

A course in "Automotive Economics and Management," taught by Dr. E. H. Hempel, is being offered this year by the Department of Industrial Engineering of Columbia University. The course is designed for engineers and other employees in industries who wish to study the economic and managerial problems encountered in their undertakings.



POWER PLUS Goes to Town on Bar Straightening

Whether it be pushing in or pulling out, Perfection Power Plus Hydraulic Jack goes to town on bumper bar straightening without removal from the job.

In fact, you'll save removal from the job on body aligning, frame work, fender straightening, rear axle housing, knee action adjustment and steel running board straightening with the two modern Perfection Power Plus hydraulic units.

The only double-acting PUSH-PULL hydraulic jack, Perfection Power Plus gives you Speed, Power Dependability, Accessibility, Adaptability throughout.

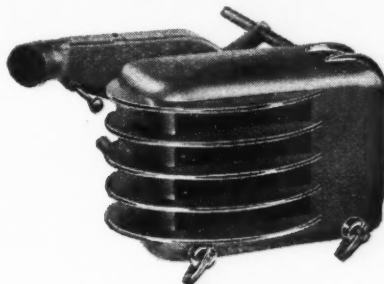
G. A. C. MANUFACTURING CO.
ASHLAND, OHIO

**1939 Edition Chilton Flat
Rate Manual available De-
cember 15, 1938.**

Red Head Heaters Feature New Styling

Associated Parts Mfg. Corp., 144 Spencer St., Brooklyn, N. Y., announce a new line of Red Head hot water heaters comprising four models; the Standard listing at \$10.95, the Senior listing at \$15.95, the DeLuxe listing at \$18.95 and the Ultra DeLuxe listing at \$21.95.

Attractiveness of these new heaters is one of their outstanding features. A unique new development is the con-



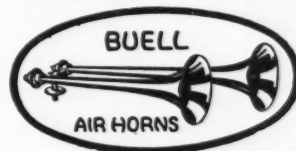
venient shut-off valve located right on the heater. Thus, the driver can change instantly from heater to air circulator. The other handle directs the stream of air to any part of the car including foot pedal area. Water pipes, supported close to the mounting brackets, simplify installation. A larger and more powerful motor, mounted with the heater core on rubber, is said to be absolutely silent in operation. For complete details, write the manufacturer.

SOLID STEEL HEAVY DUTY



One piece 20 gauge steel with rolled edges; braced with wrought iron members; massive, wide-tread, ball-bearing casters riveted to stay. Price \$4.50.

National Machine & Tool Co.
Jackson, Mich.



POWERFUL—DEEP-TONED FAR REACHING

A Horn so Good it makes a Salesman out of every customer.

Prices as low as \$7.50 for Horn Only.

Literature available on New Motor Controlled Fog or Driving Light.

BUELL MANUFACTURING COMPANY
2983 Cottage Grove Ave., Chicago, Ill.

**If you want help on that tough
job write the Readers Clearing
House.**

KANT-SLAP PISTON GUIDES

U. S. Patent No. 2,063,210

**MORE
BUSINESS**

and
more PROFIT for YOU

The low-cost, sure, easy way to cure piston slap. KANT-SLAP Piston Guides fit any type, iron or alloy, pistons. NOT AN EXPANDER. Corrects piston wear up to .025.

MASTER



MASTER Piston Expanders are easier to install than any other expander. Takes care of normal skirt collapse with less installation labor. For alloy, slotted pistons only.

ASK YOUR JOBBER—or write

WHERRY ENGINEERING CO.
3300 Washington Bl., ST. LOUIS

Look
for the
Catalog
of
New
Products
in the
December
Issue

Confidentially

Don't let 'em get away without a Thermostat in good working order—they need it for good engine performance—and hot water heater efficiency.

DOLE Replacement and Special Hot Water Heater
THERMOSTATS

See page 71

For Every Brake Service Need



"Our Special"

Complete Combination
RIVETER • DE-RIVETER
DRILLS
COUNTERSINKER
BRAKE LINING DRESSER

\$39.50

F.O.B. Kokomo, Ind.

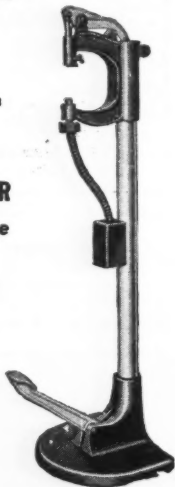
Adjustable Countersinker—
Adjustable Anvil and Die
—Automatic Hole Locator—
Standard Quick-Change
Tools—4" Grinding Abra-
sive—Attachment Cord and
Plug—Solar Steel Impact
Tools.

NEW
"MODEL A-3"
FOOT POWER
RIVETER • DE-RIVETER
Brake Lining Machine

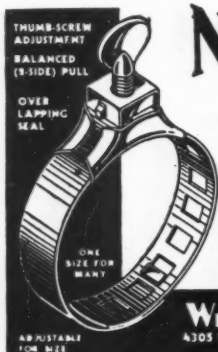
\$16.50

F.O.B. Kokomo, Ind.

Constructed with a power-
ful leverage for removing
any rivet, tubular or
aluminum, with ease.
Standard tools furnished.



THE RIESS MANUFACTURING CO.
Kokomo Indiana



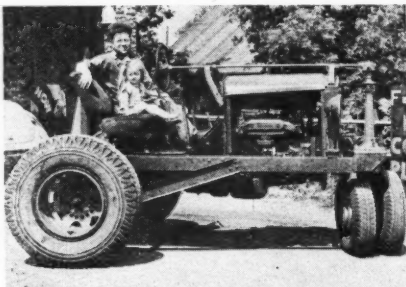
TRADE MARK
NOC-OUT
HOSE
CLAMPS

THE HOSE CLAMP WITH
THE THUMB SCREW

Seals absolutely against
leakage of anti-freeze,
radiator connections, or
heater hose. Type A, Ad-
justable, the clamp with
the thumb screw, 1 size
fits many. Type GWH for
heater hose. Type GBB for
booster brakes.

WITTEK MFG. CO.
4305 W. 34th Pl., Chicago, U.S.A.

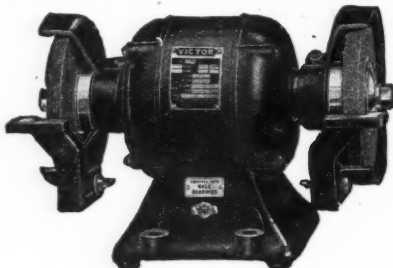
Tractor One of 50 tractors built by Harold Bergman in his garage at Scandinavia, Wis. He is shown in the driver's seat with his daughter. The tractor is powered with a Waukesha engine of 4 1/4 in. bore, 5 in. stroke. It has a Wisconsin rear axle with Budd



wheels. Front end assembly is made from a Model A axle housing using the drive shaft for the axle. Ford wheels are used on the front end. Individual wheel brakes allow a turning radius of 15 ft. It has also a starting system and lights. Mr. Bergman claims it will handle two 14 in. plows.

Stanley Offers New Bench Grinder

A new No. 66 "Victor" bench grinder, 1/4 h.p. motor, full ball bearing, 6 in. wheels, is now offered at \$18.50 by Stanley Electric Tool Division, New Britain, Conn. The new grinder is said to be particularly suited for general grinding, sharpening tools,



buffing, polishing and wire brush work. It is finished in gray enamel and is equipped with wheel guards, tool rests, toggle type switch, 3-wire rubber covered cable, rubber feet, and two grinding wheels, one coarse and one fine.

Coil Spring Replacement Parts

The St. Louis Spring Co. announces a complete line of replacement parts for front coil spring suspension for all automobiles. The St. Louis Spring Co. will exhibit the complete line at the Automotive Service Show, Chicago, Dec. 5-10.

CLEAR PROFIT!

HANDY Bat-
tery Chargers oper-
ate at a lower cost, pay
for themselves quickly, and
then it's all Clear Profit.
2-yr. guarantee.

WRITE FOR
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\$29.50
BALDOR ELECTRIC CO.
4375 Duncan Ave., St. Louis



Handy

BATTERY
CHARGERS

DEVILBISS

AIR COMPRESSORS
SPRAY-FINISHING
AND EXHAUST EQUIPMENT
OIL GUNS
HOSE AND CONNECTIONS

Write for Catalog

THE DEVILBISS COMPANY
TOLEDO, OHIO

SIMPLEX PISTON RINGS



A better ring
for less
money!

46¢
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ASK
YOUR
DEALER
WHY?

SIMPLEX PRODUCTS CORP.
3820 Kelley Ave. Cleveland, Ohio

We are telling
40,000,000 MOTORISTS:
EVEREADY PRESTONE

TRADE-MARKS

ANTI-FREEZE

Costs More by the Gallon...
LESS by the Winter

WILL YOU CASH IN?

CLASSIFIED ADVERTISING

Motor Temperature Gauges Repaired—All Makes Automobile—
Bus—Tractor—\$1.50—Marine \$2.75. Lines shortened or lengthened.
All Work Guaranteed.

United Speedometer Repair Company, Inc.
436 West 57th Street

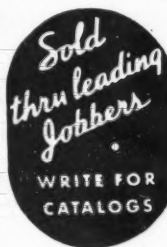
New York City

FOR THE OIL GASOLINE & WATER CONNECTIONS
VELLUMOID

A compressible, tough, uniform sheet of the
Highest Quality. VELLUMOID makes tight con-
nections which stay tight. Avoid after-worries
—be sure you get genuine VELLUMOID.

THE VELLUMOID CO., WORCESTER, MASS.

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Automotive products of guaranteed quality, including:

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Mufflers Tailpipes
Carburetors Exhaust Pipes
Silver King Hydraulic Jacks

The Simmons Mfg. Co. • Ashland, Ohio

W A N T E D to Buy for C A S H Completely Equipped G A R A G E S EQUIPMENT TOOLS, PARTS AND ACCESSORIES FOR Liquidation Purposes

For further information
write or wire

GRONIK, INC., Auctioneers
331-N. WATER MILWAUKEE, WIS.

Don't miss the December Motor Age. It contains a catalog of new products and equipment.

USL Enlarges Auto Battery Division

Because of a substantial increase in its volume of automotive battery business resulting from important contracts recently received, USL Battery Corporation is devoting the entire facilities of its Niagara Falls factory to the manufacture of automotive, radio and farm lighting batteries, according to a statement just released by H. A. Harvey, USL vice-president.

Facilities formerly devoted to the manufacture of batteries for railroad, industrial and utility service are being utilized for automobile battery manufacture and the company's industrial battery division has been discontinued.

Self-aligning Contact Points

New distributor contact points that are claimed to be self-aligning have been placed on the market by Ivano, Inc., 123 East Twenty-first Street, Chicago, Ill. Contact points, unless properly aligned and spaced, pit quickly and prevent the distributor from supplying the necessary current to the plugs. Installation of Ivano points is made in the usual manner, and then the points are opened and snapped. They automatically align themselves and automatically compensate for wear on the ignition arm while in service, according to the manufacturer.

DON'T FILE POINTS!

Flex-Stone
REG. U.S. PAT. OFF.

Flexible Contact Dresser

- Takes the hardest of Tungsten Points.
- Bends in where a file can't reach.
- Cleans and Dresses all Electrical Contacts.

Ask Your Jobber or Write Direct

RINCK-McILWAINE, Inc., 16 Hudson St., New York

NEW Sinko DeLuxe EMBLEMIZED

Bronze Spin-Ur-Wheel & Gear Shift Ball

New "Rim-Mounting" DeLuxe Spin-Ur-Wheel with medallion inserts of the Shrine, Knights of Columbus, Masons and St. Christopher in bronze are now ready for your customers. New large "Acorn" Gear Shift Ball completes matched sets. Fits all modern steering wheels; no band to deface outer rim. Fine choice of colors—red, onyx, green, yellow, grey, beige and brown.



SINKO TOOL & MFG. COMPANY
351 N. Crawford Ave. CHICAGO, ILL.

Be sure the name
Chilton is on the
Flat Rate you buy!

Extra Service! Extra Profit!

• By performance alone during recent years Dole Thermostats have earned a place on many automobile engines—they have been used also with many thousands of hot water heaters. We now offer you a rich reward to keep them there.

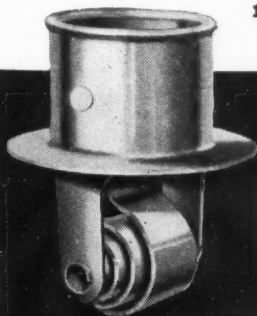
Automotive engineers knew all along that positive savings in gas, oil and engine wear with a high standard of performance, were obtainable with a good thermostat. As a result almost all cars have them: But, like any other moving part they need periodic inspection and replacement.

Dole Replacement Thermostats are now included in this complete line. Probably you are already used to the profit from adding a Dole Thermostat to each hot water heater installation for quicker warmth and greater comfort. Keep on collecting this profit but add the new one by giving customers extra service. Tell the motorists who don't have hot water heaters when their standard equipment motor temperature control thermostats need replacement.

Ask your jobber what Dole Thermostats to carry for complete service.

THE DOLE VALVE COMPANY

1901-1941 Carroll Avenue • Chicago, Illinois
Offices and Representatives in all Principal Cities
Detroit Office: 2-137 General Motors Building



Replacement and Special Hot Water Heater
DOLE THERMOSTATS



ALL OVER THE WORLD DURO-CHROME *Is A Big Name in Tools* BECAUSE



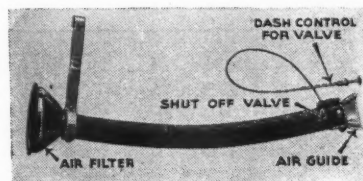
**GET MORE FOR
YOUR MONEY—
BUY DURO
SEND FOR CATALOG**

DURO METAL PRODUCTS CO
2694 NORTH KILDARE AVE, CHICAGO, ILL.

- ★ Duro Chrome—The finest and toughest of alloy steels gives Duro Tools the ability to stand up through a long life of hard service.
- ★ Designed by mechanics for mechanics. They whip the meanest jobs with ease. Repairmen everywhere are turning to Duro because they can do their work easier and better with Duro Tools.
- ★ A complete line—Matched sets—or special tools for specific jobs.
- ★ All Duro Tools are fully guaranteed against defect in either material or workmanship.

Features Winter Air Conditioning

Winter air conditioning is a feature of the new line of Chanson heaters made by the Chanson Heater Division of the Illinois Iron & Bolt Co., 10 Main Street, Carpentersville, Ill. This is accomplished through the development of a fresh air attachment which can be attached to any make of car and to practically any make of hot water heater. It consists of a device for taking fresh air coming in through



the radiator, passing it through a filter to remove dust, dirt and impurities and directing it to the hot water heater for distribution to the car.

Outstanding in the Chanson line is a new heater for Ford V-8 cars. Tailor made for Ford installation, the fittings are larger and advantageously located to provide greatest efficiency; a large core and special fan provide greater air volume.

Wagner Offers New Stocking Plan

An assortment of 429 parts comprising 78 different fast moving items constitutes the new FL-2E medium general assortment of Wagner Lockheed hydraulic brake parts recently announced by the Wagner Electric Corp., 6400 Plymouth Avenue, St. Louis, Mo. This assortment is designed to meet the needs of the average brake service station as well as car dealers and independent repair shops. Other assortments are available to meet individual needs.

These assortments are housed in steel cabinets of uniform size, so that a dealer can start with one assortment and gradually add to his stock as business increases, developing a complete stock of brake parts attractively housed in steel cabinets.



**"Jones has technique in parking a car
in a tight spot!"**

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of MOTOR AGE, published monthly at Philadelphia, Pa., for October 1, 1938.
State of Pennsylvania } ss.
County of Philadelphia }

Before me, a notary public in and for the State and county aforesaid, personally appeared Joseph S. Hildreth, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Motor Age and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Chilton Company, Chestnut & 56th Sts., Phila., Pa.; Editor, Julian Chase, Chestnut & 56th Sts., Phila., Pa.; Managing Editor, William Toboldt, Chestnut & 56th Sts., Phila., Pa.; Business Manager, Joseph S. Hildreth, Chestnut & 56th Sts., Phila., Pa.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Chilton Company, Chestnut & 56th Sts., Phila., Pa.

Holders of more than 1% of the capital stock outstanding of Chilton Company: C. A. Musselman, 260 Sycamore Ave., Merion Station, Pa.; F. J. Frank, Laontaka Way, Madison, N. J.; F. C. Stevens, 325 West End Avenue, New York, N. Y.; J. S. Hildreth, 429 Owen Road, Wynnewood, Pa.; G. H. Griffiths, 165 Montclair Ave., Montclair, N. J.; E. B. Terhune, 160 E. 48th St., New York, N. Y.; John Blair Moffett, 1608 Walnut St., Philadelphia, Pa.; Wm. A. Barber, 185 Summit Lane, Bala-Cynwyd, Pa.; C. S. Baur, 76-77 Austin Street, Forest Hills, N. Y.; J. H. Van Deventer, 12 Phillips Place, Yonkers, N. Y.; P. M. Fahrendorf, 19 Tunstall Rd., Scarsdale, N. Y.; Dorothy S. Johnson, 1327 N. Greenway Drive, Coral Gables, Fla.; Anne E.

Tomlinson, c/o Bankers Trust Company, P. O. Box 492, Grand Central Annex, New York, N. Y.; Ethel G. Breen, Trustee u/w of Charles W. Anderson, 51 East 42nd St., New York, N. Y.—Beneficiaries: Robert C. Anderson, Percival E. Anderson, Charles W. Anderson, Jr., Annie L. Clark; John Blair Moffett, 1608 Walnut St., Philadelphia, Pa.—Agent for J. Howard Pew, J. N. Pew, Jr., Mabel P. Myrin, Mary Ethel Pew; Elizabeth J. Bailey and Ellwood B. Chapman, Trustees Estate of James Artman, Deceased, 930 Real Estate Trust Building, Philadelphia, Pa.—Beneficiaries: Franklin Artman, Vera Watters, Alvin C. Artman, Elizabeth J. Artman, Marion A. Pratt, George H. Pratt, by assignment, Edwin Moll, by assignment; Bankers Trust Co. and Wilfred T. Pratt as Trustees u/w of Eugene Sly F.B.O. Beulah B. Sly, P. O. Box 704, City Hall Station, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily publications only.)

JOS. S. HILDRETH, V.-P., Business Manager.
Sworn to and subscribed before me this 15th day of September, 1938.

JOSEPH W. FRITZ.
(My commission expires Feb. 19, 1939.)
[SEAL.]

Tune up Your Sales with **THE ENGELHARD** Exhaustalyser



Your cash register will ring up the dollars more often when motor "tune-up" is done the Engelhard way. Exhaust gas analysis is the answer to your spring "tune-up" campaign. It makes it easy for you and your customer.

Write for Bulletin 601

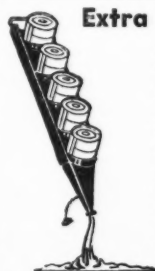
CHARLES ENGELHARD, Inc.
90 Chestnut St., Newark, N. J.

Manufacturers of Pyrometers, Resistance Thermometers, Combustion Indicators, Exhaust Gas Analysers, Flue Gas Analysers, Thermocouples.

There are
PLENTY OF
VALVE JOBS
for Shops equipped with
HALL VALVE SERVICING
EQUIPMENT

Ask your Jobber
or write

THE HALL MFG. CO.
TOLEDO, OHIO



\$1.75 net.
\$1.95 West
of Rockies
Patented

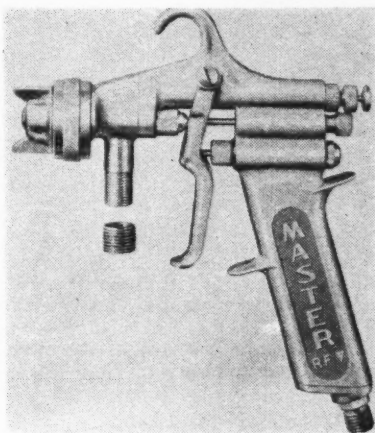
Extra \$ \$ \$ for you.

Salvage and sell the oil that clings to the sides of supposedly empty oil cans. Pocket 25¢ clear profit per quart. Simply rack up your "empties" in a Drain-All rack before discarding them. Draining 20 cans yields quart, or more, of salable oil. Like tapping an oil well. Get details—WRITE!

DRAIN-ALL CO.
1315 Atlantic Ave.,
Atlantic City, N. J.

Paint Spray Gun Has New Features

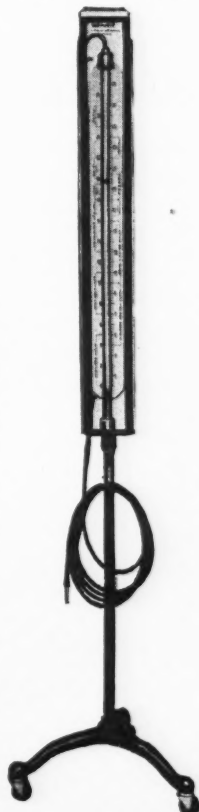
A new paint spray gun with several new features has been introduced by Burning Brand Co., 1400 West Fulton St., Chicago, Ill. Among these features are: instant finger-touch control, changing from fan to round spray without stopping; filter in the handle to keep out impurities from



the rubber hose and to prevent clogging of air passage; interchangeable spraying heads for different types of work; light weight; stainless steel air passage in cap, with needle valve and nozzle also made of stainless steel hardened and ground. The new gun is said to have excellent atomization at air pressure as low as 20 lbs., and will operate equally well at air pressures up to 90 lbs. For complete information and prices, write the manufacturer.

Vacuum Gage by Weaver

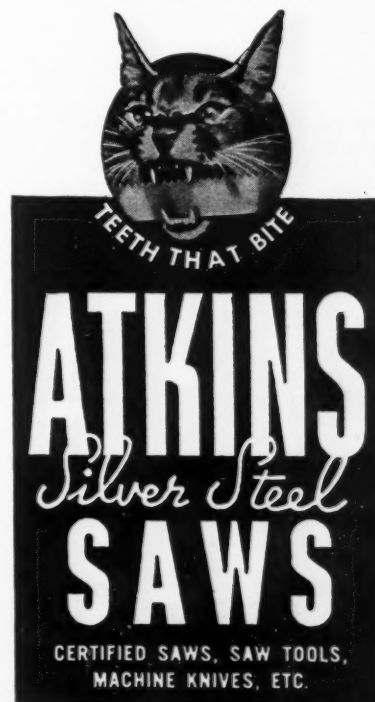
A new mercury column vacuum gage mounted on a tripod with casters for instant use has been announced by The Weaver Mfg. Co., 2177 S. Ninth St., Springfield, Ill. The gage is calibrated to show possible causes of trouble according to the position of the column of mercury in the tube; causes are listed on the gage as improperly adjusted carburetor, incorrect valve timing, leaky valves, late timing, air leaks at manifold gaskets, and others. The unit is reported to be priced considerably lower than other equipment of similar nature, and is being distributed through Weaver jobbers from coast to coast.



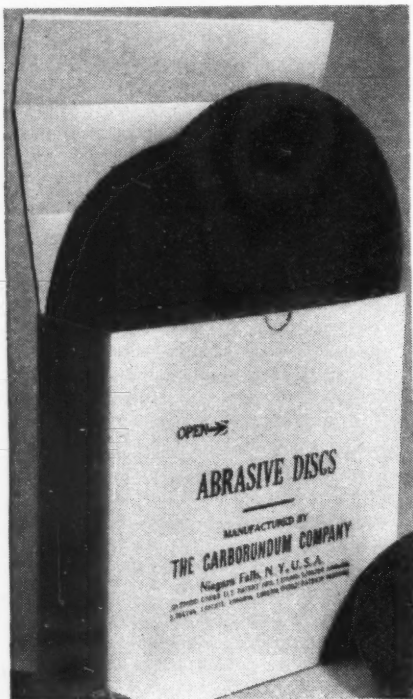
The metal working industries are rapidly becoming unanimous on one point... when fast, continuous performance is vital to production schedules and costs, Atkins Blue-End Hacksaw Blades are indispensable. That's because Blue-Ends—made of Atkins Silver Steel—have demonstrated on job after job their matchless performance on any metal that can be cut by a hacksaw... their ability to cut economically and rapidly many metals other blades will not touch.

You need not take anyone's "say-so" that fast, easy-cutting Atkins Blue-End Hacksaw Blades will outperform. They are guaranteed to cut more metal than than any other blade. Capitalize the better performance of Atkins Silver Steel Blue-Ends. Use them to step up production, reduce time-out for blade changes, and cut blade purchase orders per job.

E. C. ATKINS AND COMPANY
423 S. Illinois St.,
Indianapolis, Ind.



FINISH FENDERS FASTER



● Here's an easy way to reduce your metal finishing costs, increase the production of your shop, and improve the quality of your work. Simply switch to Aloxite Brand Aluminum Oxide Combination Fibre Discs!

There are 3 good reasons why these discs cut faster and last longer. (1) They are coated with uniformly graded, hard, sharp, tough abrasive grains. (2) The abrasive coating is securely held to the backing. And (3) the backing itself is a special combination of cloth and hard, dense fibre, so designed that the abrasive performs with maximum efficiency on both contours and flat metal surfaces.

Why not try these Carborundum-made discs in your shop? You'll be amazed at the improved finish, the increased production and the saving in costs. Ask for them by name. Say "Aloxite Brand".

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

Niagara Falls, N. Y.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

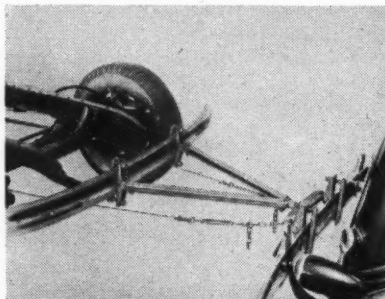
[Carborundum and Aloxite are registered trade-marks of The Carborundum Company]

CARBORUNDUM
REG. U. S. PAT. OFF.
ABRASIVE PRODUCTS



New One-Man Tow Bar

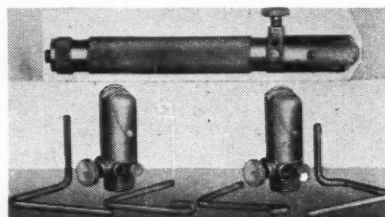
A new type of one-man tow bar has been developed by Red Arrow Tow-Bar, Dearborn, Mich. The bar attaches to the bumpers and is equipped with flexible steel cables which attach to the towed car to steer it while it is



being towed. It is designed to handle all cars with standard axles or with knee action construction, and can be attached without jacking up the car. List price, \$27.50. For complete information and descriptive literature, write the manufacturer.

Hand Striper

A simple precision paint striping tool providing a convenient and economical means of applying decorative lines of uniform weight and thickness in automotive repair and refinishing work, has been announced by The DeVilbiss Co., 300 Phillips Ave., Toledo, Ohio. Said to operate equally well with paint, lacquer or synthetic enamel, the tool is held in the hand like a fountain pen. Interchangeable



heads are included in the kit, providing a stripe 1/64 in., 1/32 in., and 5/64 in. wide. Feed to the striping wheel is supplied by a gear pump which operates at a speed commensurate to the action of the wheel. For complete information and prices, write the manufacturer.



"Better grease it—my wife keeps thinking there's mice in the car!"

Gardiner
30/70 BODY SOLDER

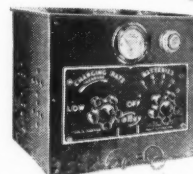
NOW AVAILABLE
IN
**1/2 POUND
BARS**

Now the superior alloy that has made Gardiner meter bar, regular bar and 1/4-inch round body solders outstanding favorites with leading car makers, body builders and discriminating shops is available in 1/2-Pound Bars. Due to modern production methods they are priced lower than even ordinary solder. Your jobber can supply the new 1/2-Pound Bars of Gardiner 30/70 promptly... also wire and flux-filled Solders and Babbitts.



4839 South Campbell Ave., Chicago, Ill.

A Money Maker!



Valley Battery chargers quickly repay their low first cost in added profits. Fully guaranteed for two years.

Model G-12 charges 1 to 12 6-volt batteries.

Only \$28.00

Other sizes at equally low prices. Write for free bulletin.



Valley Electric Corp.

4221 Forest Park Blvd. • St. Louis, Mo.

YOU'LL NEVER KNOW

● THE PROFIT OPPORTUNITY in Fitzgerald Gaskets until you handle them.

THE FITZGERALD MFG. CO., TORRINGTON, CONN.

**FITZGERALD
GASKETS**

"TIMKEN"

TRADE-MARK REG. U. S. PAT. OFF.

Another Word For CONFIDENCE



Confidence is the root of success. Your success as an automobile repair man and our success as a bearing manufacturer depend upon winning and holding the confidence of those we serve. Universal confidence in the TIMKEN Bearing and the company behind it has been built up by 40 years of pioneering tapered roller bearings throughout all industry; by constantly working to improve our product; by millions of

dollars invested in steel-making equipment, master gauges, dies and automatic machines to assure quality and precision; and by standing back of our product under all circumstances. When you install TIMKEN Bearings in your customers' cars you share the benefits of this confidence through increased good will and the repeat business it brings—for the only customer who keeps coming back is a *satisfied* customer.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
SERVICE-SALES DIVISION

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN

TAPERED ROLLER BEARINGS



The "Airstream" PORTABLE ELECTRIC SANDERS

7" Light Duty
7" Standard

7" Heavy Duty
9" Standard



STREAMLINED design; air filter (air cleaned before entering tool). Dustproof bearings permanently lubricated. Dustproof switch shielded from breakage.

**MORE POWER.
IMPROVED BALANCE.**

Reversible side handle. Spindle lock for easy change of discs. Extra heavy gears of chrome nickel alloy steel, hardened, run in grease-tight case. Oversize bearings. Castings of special alloy aluminum.

Write for NEW Catalog

THE UNITED STATES



ELECTRICAL TOOL CO.

CINCINNATI,

OHIO, U.S.A.

IT'S A MATTER OF RECORD THAT CHAMPIONS PERFORM BETTER



WESTERN UNION

DETROIT MICHIGAN
OCTOBER 2, 1938

CHAMPION SPARK PLUG COMPANY
TOLEDO OHIO

WON THE 150 MILE MIDGET CLASSIC BREAKING MY LAST
YEARS RECORD FOR THE 300 LAPS STOP AS USUAL MY
CHAMPIONS FUNCTIONED PERFECTLY FOR ENTIRE DISTANCE

RONNEY HOUSEHOLDER



WESTERN UNION

CHATTANOOGA TENN
SEPTEMBER 20, 1939

CHAMPION SPARK PLUG COMPANY
TOLEDO OHIO

RETAINED CLASS A AND B NATIONAL CHAMPIONSHIP
DIVISION ONE STOP ESTABLISHED NEW B AMATEUR RECORD
OF FIFTY THREE POINT SIX O TWO MILES PER HOUR AND
NEW AMATEUR C RECORD OF FIFTY SEVEN POINT EIGHT ONE
O MILES PER HOUR STOP MANY THANKS TO CHAMPION SPARK
PLUGS

GAR WOOD JR.



WESTERN UNION

JUL 4, 1938
TORQUAY

EARL TWINING

CHAMPION SPARK PLUGS AGAIN PROVED THEIR
SUPERIORITY IN EMANCIPATOR SEVEN WINNING DUKE
OF YORK TROPHY

MORTIMER AUERBACH



WESTERN UNION

SYRACUSE, N Y
SEPT 10, 1939

CHAMPION SPARK PLUG CO
TOLEDO OHIO

CHAMPION SPARK PLUGS PERFORMED PERFECTLY HELPING ME
WIN 100 MILE AAA CHAMPIONSHIP RACE AT SYRACUSE TODAY

JIMMY SNYDER



WESTERN UNION

NEW YORK N Y
DECEMBER 16, 1937

CHAMPION SPARK PLUG COMPANY
TOLEDO OHIO

CHAMPION SPARK PLUGS UNDOUBTEDLY WERE A REAL
FACTOR IN AIDING ME TO WIN MY EASTERN AND
NATIONAL CHAMPIONSHIPS IN SETTING SOME NEW
WORLD RECORDS AND IN COMPILING THE GREATEST
NUMBER OF POINTS SCORED BY ANY ONE DRIVER IN ONE
SEASON STOP LIKE A GREAT MANY OTHERS I CAN SAY
CHAMPIONS HELPED MAKE A CHAMPION OF ME

DOUGLAS FONDA



WESTERN UNION

MAY 30, 1938
46

INDIANAPOLIS IND

THANKS TO THE PERFECT PERFORMANCE OF
CHAMPION SPARK PLUGS IN MY BURD PISTON
RING SPECIAL I WON FIRST PLACE IN THE
SPEED OF 117 20 MILES PER HOUR STOP YOU CERTAINLY CAN DEPEND
ON CHAMPIONS

FLOYD ROBERTS

The fact that Champions make every engine a better performing engine is testified to by a constant stream of voluntary and enthusiastic telegrams from victorious owners and drivers of racing cars, boats, midgets, motorcycles and airplanes. This concrete evidence proves, as nothing else can, that the vast sums spent by Champion to maintain research, engineering and manufacturing leadership is of inestimable value to us, to our trade, and to the ultimate consumer.

For greatest profits, turnover and consumer satisfaction, stock and push the spark plugs champions use — Champions.

CHECK AND CLEAN SPARK PLUGS WHEN YOU CHANGE OIL

MOTOR AGE, November, 1938

When writing to advertisers please mention Motor Age

SELL THE
SPARK PLUG
CHAMPIONS
USE



**FOR
1939**

Be Modern.

**NEW! MORE LUGGAGE CAPACITY IN
HIDDEN RECESSED TRUNK!**

True streamlines banish the bulging trunk! Body and fenders sweep back in tapering lines of striking modern beauty. Yet the luggage compartment—opened from the rear—has more carrying capacity than ever before!

**NEW! BODY 4" WIDER . . . MORE
SPACE, GREATER COMFORT**

Chrysler's already roomy body is now 4" wider at the windshield! Seats are literally as wide as divans. Up to now, roominess has been merely relative . . . some cars gave a trifle more than others. Here is a car so roomy you feel its spaciousness the moment you enter it!



1939 CHRYSLER ROYAL 100 Horsepower
119-Inch Wheelbase

1939 CHRYSLER IMPERIAL 135 Horsepower
125-Inch Wheelbase

Also Chrysler's famous Custom Imperial in five and seven passenger sedans and limousines.

TUNE IN ON MAJOR BOWEN, COLUMBIA NETWORK, EVERY THURSDAY,
9 TO 10 P. M., E. S. T.

**NEW! CRUISE AND CLIMB
TRANSMISSION**

A transmission that thinks for you . . . shifts automatically on demand between pick-up and cruising ranges according to power required. Flashes you out of tight places instantly . . . in ordinary driving gives much greater use of gas-saving automatic overdrive.

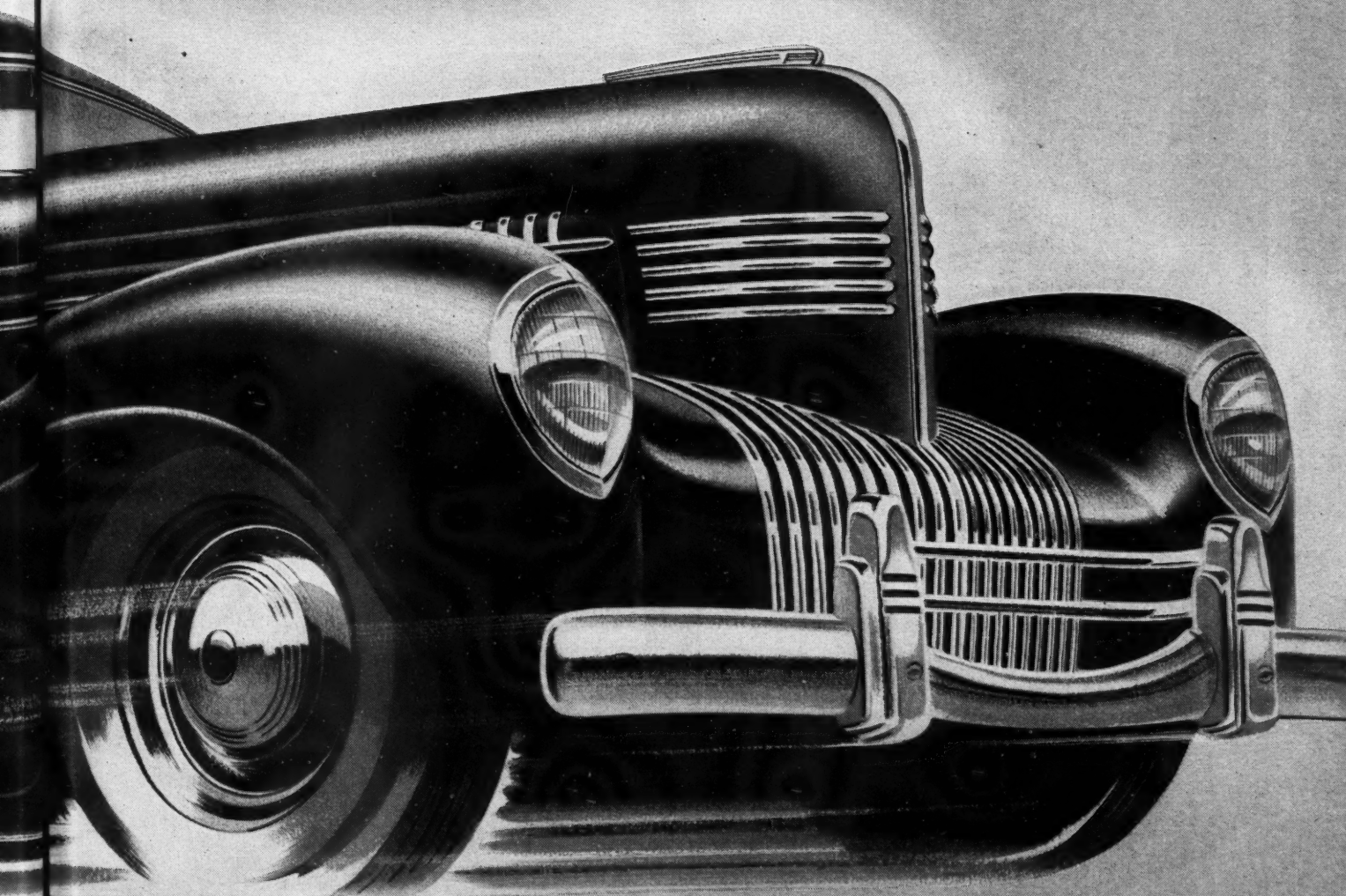
Buy Chrysler!

NEW! STEERING WHEEL GEAR-SHIFT

The gear-shift lever at your finger tips... right under the steering wheel. Shifting requires no more effort than steering. Easy... simple... safe! Clashless... quiet... sure! A great modern advancement!

NEW! ADVANCED AIRFLOW STYLING

Chrysler pioneered modern streamline design in the Airflow... now brings it to new modern smartness and beauty... permitting great interior roominess in the sleekest, most dashing-looking car that ever took the road.



NEW! PLASTIC INSTRUMENT PANEL... BEAUTIFUL AND SAFE!

Modern chemistry makes possible the gorgeously beautiful instrument panel. Control buttons are recessed for safety. The speedometer signals in different colored lights to warn you of dangerous driving speeds.

NEW! POWER, HANDLING EASE, SAFETY... ALL AT A NEW CHRYSLER TOP!

Greatly increased horsepower... coupled with the modern economy of the Cruise and Climb Transmission! Steering and gear-shifting of feather touch ease. Chrysler's famous hydraulic brakes and Safety All-Steel Body. Every great Chrysler engineering feature. The most modern motor car on the road!



SOLD ONLY BY *Independent* DEALERS

NEW LOW PRICES

- ★ NO. 3 NOW SAME PRICE AS ORDINARY KINDS
- ★ FREE PEDAL ACTION AT 50° BELOW ZERO

The most completely non-evaporating brake fluid. Mixes with other approved fluids. Non-injurious, non-poisonous.

Pt.—Qt.—1-5 Gal.

ONE TYPE SERVICES ALL EQUIPMENT



Seals **SYSTEM**

MAKES ANTI-FREEZE LAST LONGER!

- ★ ★ AN EXTRA PROFIT ON EVERY ANTI-FREEZE SERVICE



Anti-Seep, a clear liquid, prevents Anti-Freeze leakage. Non-injurious. Alkosave, Jr., a rubber cap for overflow pipe, cuts loss by evaporation. Insured by Hartford Indemnity Co as safe for use on motor cars. A perfect combination for extra profits.

ANTI-SEEP STOPS LEAKAGE

ALKOSAVE, JR. CUTS EVAPORATION



Regular Value 69c • Combination Retail 49c

TWO NEW GASKET MAKERS

NO. 1 FAST DRYING HARD SETTING **NO. 2** SLOW DRYING STAYS PLIABLE

100% PRESSURE TIGHT JOINTS
FREE

3-oz. Tube Same Type with 11-oz. Size.

11-oz. Packed in Metal Can—3-oz. in Canister.



WHEN YOU GET 'RYTHM' YOU'LL ENJOY New and Greater Tune-up Profits

For non-mechanical tune-up. Corrects "bucking"—power loss—sluggishness—hard starting—excessive gas consumption and "missing" caused by gum. Eliminates carbon "ping". An ideal Anti-Freeze for gear lubricant.

Supported by powerful sales promotion aids.

Pints—Quarts—1-5-15
30-55 Gallons.

FREE GOODS—ASK YOUR JOBBER



R. M. HOLLINGSHEAD CORP., Camden, N. J., Toronto, Canada

SHALL I
CHECK YOUR
TIRE CHAINS?



WEED CHAIN Sales Makers



6 Potent Profit Words

... Ask Every Customer This Month

● "Shall I check your Tire Chains?"—that simple, easy sales approach is resulting in thousands of quick decisions to buy WEED Americans or repair old chains.

Dealers tell us this vigorous revival of interest in chains is partly due to the driving force of the national campaigns for motoring safety.

State and city officials are urging special precautions against the dangers of winter driving. Many of them definitely recommend chains. WEED American Bar-Reinforced Tire Chain advertising in national magazines and newspapers is converting this nation-wide movement into immediate sales for you.

Set up your WEED American window displays. They're powerful, dramatic, colorful, convincing. They are based on years of experience in planning the strongest possible aids to your own good salesmanship. Better have them sent you at once if they're not already in your hands.

How's your stock of WEED American Tire Chains? Snow storms play no favorites. They won't wait for you to phone or wire for missing sizes and repair parts. But they'll pour a stream of profits into your cash register if you're ready in advance with well-balanced stocks.

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

In Business for Your Safety



WEED AMERICAN Bar-Reinforced TIRE CHAINS

Licensed to manufacture and sell Bar-Reinforced Tire Chains under United States and Canadian Letters Patent: American Chain & Cable Company, Inc.; The McKay Company; The Hodel Chain Company; Pyrene Manufacturing Company; Dominion Chain Company, Limited; and Pyrene Manufacturing Company of Canada, Limited.

**AC's
FAST-MOVING
PROFITABLE
LINE**



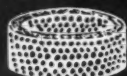
AC PLUGS



TITAN



**KLEER KLEEN
OIL FILTERS**



**AIR CLEANER
ELEMENTS**



AIR CLEANERS



OIL FILTERS



**REMO
FLUID**



**REFLEX
SIGNALS**



FUEL PUMPS

**IT'S A SURE CURE
FOR SLUGGISH ENGINES - GAS WASTE
AND HARD STARTING**



**... and a NATURAL
for selling plugs!**

Five years of retail experience have proved that the AC Plug Cleaning Program makes it *much easier* to sell new plugs. Here is how thousands of successful retailers do it:

Every time a car is left for service OF ANY KIND, the retailer gets the car owner's permission to clean, re-gap, and check his spark plugs.

When a car is left with you for service—for anything from an oil change to a major repair job—get the owner's OK to clean and adjust his plugs. *Plug cleaning sells 2 new plugs for every 6 cleaned.*

Follow this method every day, and your plug sales will go up. Cash in on the millions of dollars that AC has spent in advertising plug cleaning.

Be sure your plug stock is complete enough to meet the needs of your trade.

**Have Your AC Wholesaler's Salesman Check Your Stock
TODAY!**

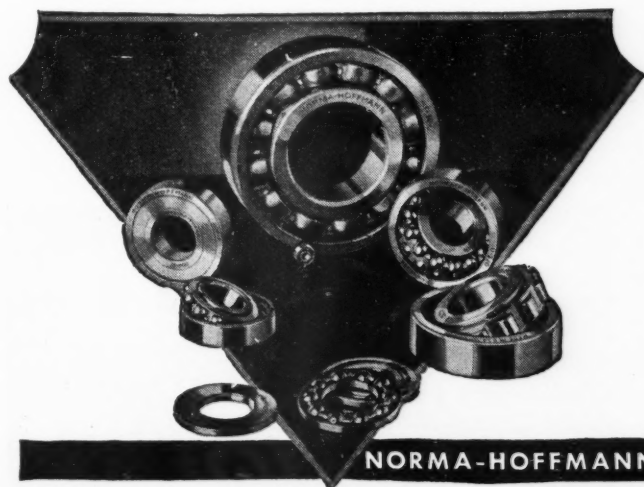
AC SPARK PLUG DIVISION • General Motors Corporation • FLINT, MICHIGAN

When writing to advertisers please mention Motor Age

MOTOR AGE, November, 1938

ADVERTISERS' INDEX

AC Spark Plug Div. General Motors Corp. 10	Fitzgerald Mfg. Co. 74	Olds Motor Works 44-45
American Chain & Cable Co., Inc. 9	Flare Laboratories (Formerly Flash) 67	Parts Mfg. Corp. 66
American Hammered Piston Ring Div. of Koppers, Inc., Back Cover	Ford Motor Co. 47	Riess Mfg. Co., The 70
Atkins & Co., E. C. 73	G. A. C. Mfg. Co. 69	Rinck-McIlwaine, Inc. 71
Baldor Electric Co. 70	Gardiner Metal Company 74	Rotawasher Corp. 67
Brownie Tool Co. 61	Gould Storage Battery Co. 76	Simmons Mfg. Co. 71
Buell Manufacturing Company. 69	Gronik, Inc. 71	Simplex Products Corp. 70
Burd Piston Ring Co. Associate Co. Liberty Foundries Co. 42	Hall Mfg. Co. 73	Sinko Tool & Mfg. Co. 71
Carborundum Co. 74	Hollingshead Corp., R. M. 6	Standard Pressed Steel Co. 60
Champion Spark Plug Co. 3	Johns-Manville 62	Sure-Rite Products Corp. 68
Chrysler Corp. 4-5	K-D Lamp Co. 46	Thepton Mfg. Co., Inc. 68
DeVilbiss Co., The 70	K-D Mfg. Co. 67	Time Inc. (Life), 49-50-51-52-53-54-55-56
Dole Valve Co. 67-69-71	King Quality Products Co. 7	Timken Roller Bearing Co., The 1
Do-Ray Lamp Co. 67	Koppers Co., American Hammered Piston Ring Div., Back Cover	Toledo Steel Products Co. 41
Drain-All Co. 73	Lamson & Sessions Co., The.. 57	U. S. Air Compressor Co. 2nd Cover
du Pont de Nemours & Co., Inc., E. I. 48	Langenkamp-Linkert Carburetor Co. 68	United States Electrical Tool Co. 2
Duro Metal Products Co. 72	Life (Time Inc.), 49-50-51-52-53-54-55-56	Valley Electric Corp. 74
Edelmann & Co., E. 3rd Cover	Lincoln Engineering Co. 43	Vellumoid Co. 70
Engelhard Co., Charles 73	National Carbon Co., Inc. 70	Western Chain Products Co. 68
Ethyl Gasoline Corp. 64-65	National Machine & Tool Co. 69	Wherry Engineering Co. 69
	Niehoff & Company, C. E. 67	Wittek Manufacturing Co. 70
	Norma-Hoffmann Bearings Corp. 75	



"NORMA-HOFFMANN" PRECISION BEARINGS

Will protect you against "come backs" and give your customers that extra-serviceability they like. They are builders of business and good will. Use these PRECISION Bearings in your replacement jobs—the same bearings that are original equipment in many of the finest cars, trucks, busses and airplanes. Write for the latest Price List and name of nearest distributor.

NORMA-HOFFMANN BEARINGS CORP'N.—STAMFORD, CONN., U. S. A.

Precision Ball, Roller and Thrust Bearings

Out of the blue—AN AMAZING NEW AUTO BATTERY!



**Gould now offers you famous
SPUN GLASS CONSTRUCTION
at competitive price!**

U. S. Navy airplanes have long relied upon the special spun-glass construction of Gould Batteries. Railroads, ships and industries, too, have found that this special feature greatly prolongs battery life . . . steps up battery performance.

Now Gould has found a way to put this same principle in an automotive battery, priced to match batteries of ordinary construction! Not in many years has any battery offered such a sensational selling advantage! It means that you can offer your customers the Gould Glass-Klad with a two and a half year guarantee and adjustment policy. It puts real teeth in your longer life and better performance story. It spells more sales, bigger profits for you! Don't miss these profits. Write for complete information today.

GOULD STORAGE BATTERY CORPORATION
Depew, New York

OTHER GREAT GOULDS



KATHANODE—The original spun-glass automotive battery, "guaranteed as long as you own your car."

DREADNAUGHT—Famous standard-sized Gould with 6 extra heavy duty plates. A big value with a big profit.



SCOUT—Heads the Gould competitive types, sturdy performers built to meet all prices and give you a fair profit.

GOULD
"THE BATTERY
PICKED BY ENGINEERS"



**YOU CAN'T TEST
ANTI-FREEZE
ACCURATELY-IF
YOU CAN'T SEE!**

These Dark Winter Nights You Need ILLUMINATED Testers!



You may as well test blindfolded as to test with an unlighted tester. If you're like thousands of other service station operators you guess—rather than make sure—when testing anti-freeze at night.

But guessing today is a thing of the past. Now with revolutionary new Illuminated Testers you simply press a button as you draw up the solution and the entire instrument lights up—like an electric sign! You can't give the wrong anti-freeze reading to your customer, you can't possibly go wrong.

Every single division of the tester is so simple to understand, so easy to read, so quick to find, you'll think you're reading a picture book rather than what was once a complicated technical job. Yet with all these improved features, Edelmann testers are now more accurate than ever. Engineers who are never satisfied stage twelve separate tests for each instrument before it goes out.

So every time you squeeze the rubber bulb to make another reading, you have the assurance, that the largest and oldest manufacturer of testers in the world has checked and re-checked your very tester for long life—for service long after ordinary testers are thrown into the junk heap.

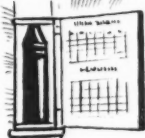
Ask your jobber or his salesmen. E. Edelmann & Co., Chicago.

**BE SURE ALL THESE EASY READING
FEATURES ARE IN YOUR TESTER BEFORE
YOU BUY**



Built-In Lighting

You test at night just as quickly and accurately as testing during the day.



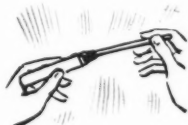
Metal Correction Tables

Attached outside of tester away from dirt and grease—yet always easy to find.



Independent Barrel

Dirty or cloudy anti-freeze never covers small figures on thermometer scale



Flexible Almost Unbreakable Float

Reduces costly replacement expense.



Everything You Need Right on the Instrument

No need for consulting inside charts or detailed technical maps.



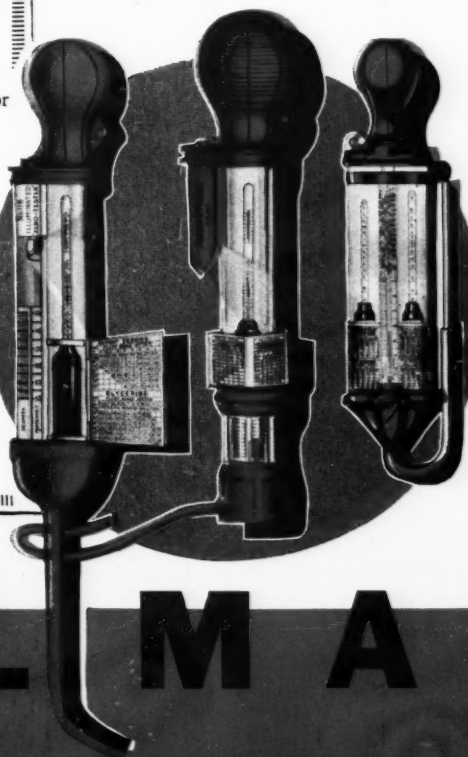
Accuracy Is The Keynote

Assemble slowly—like a clock—for 100% accuracy.



Cushioned in Rubber

All glass parts fully protected and incased in rubber so that glass never comes in contact with hard floor or work bench.

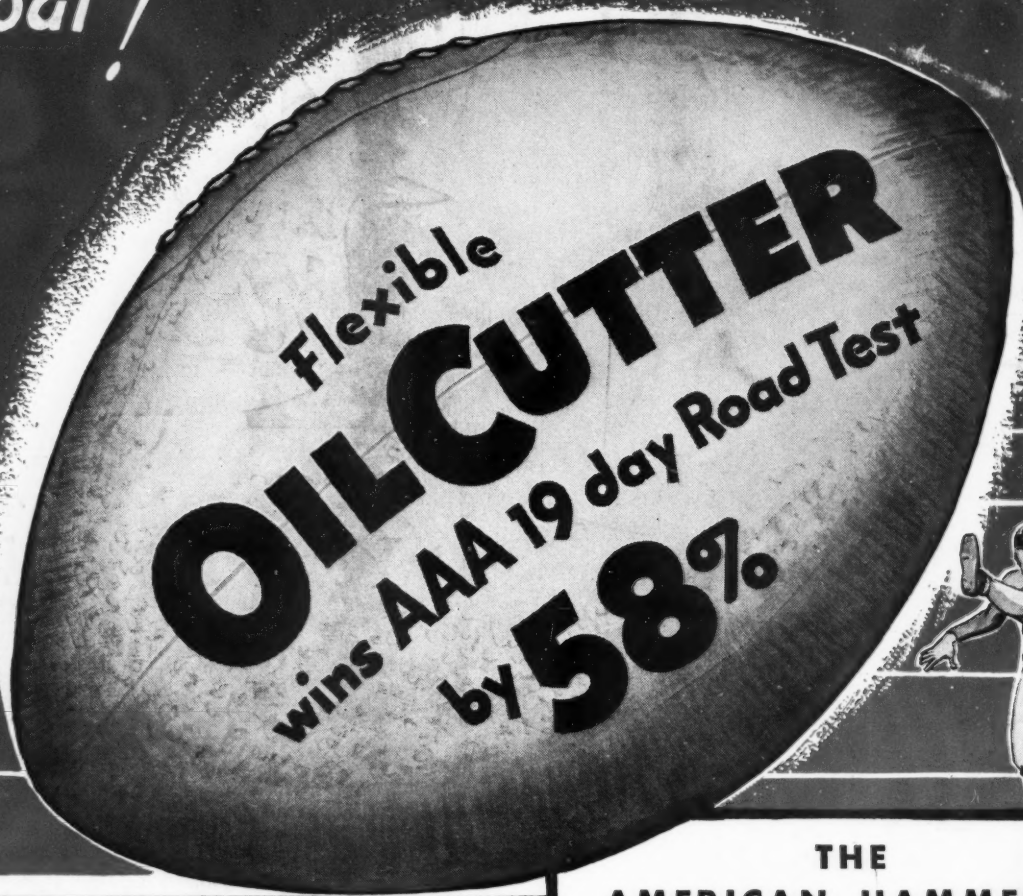


**ANTI-FREEZE
TESTING WAS
NEVER SO
ACCURATE
So Easy!**

EDELMANN

MAGIC ILLUMINATED Anti-Freeze TESTERS

*Kicks piston ring replacement problems
for a goal!*



THE AMERICAN HAMMERED STEEL-EDGE

Here is the first *all steel* piston ring. It is not a combination of iron and steel, alloy and steel, or any other compromise of metals. It is designed to give absolute oil control in cylinders tapered over .015". For the most severe oil pumpers, specify the new American Hammered Steel-Edge.



Forget piston ring CLAIMS. Stick to FACTS when you select replacement rings for the next job that comes into your shop!

And here are the facts of piston ring performance—established and certified in the complete 19 day road test conducted by the AAA Contest Board during November, 1937. In competition with three other leading competitive rings (both cast iron and combination cast iron and steel) Flexible OilCutter excelled the combined average "miles-per-quart" performance of all three by an average of 58%!

With this *fact* as a guide... there's no problem in choosing the ring that will do the best job for you.

KOPPERS COMPANY

American Hammered Piston Ring Division
Baltimore, Md.

American Hammered Piston Rings

a K O P P E R S product

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